# Evaluation of the Amazing Science Summer Program

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## Evaluation of the Amazing Science Summer Program

The Amazing Science Summer program has been in existence for many years, and each year the program is evaluated to determine its effectiveness. This year the program used several components to complete the evaluation such as: using pretests and posttests to measure students' learning of the material, an attitude measurement regarding students' interest in math and science, satisfaction questions focusing on their experiences of the activities, as well as group interviews that obtained information from the teachers (Aurora University and District teachers), and student teachers (college-aged students). One last form of assessment was observation and discussion with the kids who participated in the program. This report is organized in the following manner. First the History and Methodology of the program will be stated, followed by quantitative data demonstrating the increase in knowledge students achieved throughout the program. Next will be the observation and feedback from the students, which is followed by the qualitative data gathered from the group interviews: teachers (Aurora University and District teachers), and student teachers.

## History and Methodology

It is important to note that this year the following sponsored the program: Aurora University, Communities in Schools, the city of Aurora, and the William G. McGowan Family Fund. The 2014 Amazing Summer Science program implemented portions of units from the John C. Dunham STEM Partnership School curriculum. This innovative curriculum, based on Next Generation Science Standards, was collaboratively developed between school district teachers, university faculty, not-for-profit partners, and corporate partners. One topic area was Matter and Energy with focus on energy changes in everyday life from chemical reactions to recycling. The second area was Structure and Functions with emphasis on prosthesis and how limbs function as machines. The program also integrated visual programming language to create simulations that demonstrated learned concepts.

The program began formally in April 2014 when Aurora University faculty and district teachers began to meet and discuss the curriculum and how that curriculum would be thoroughly administered; the faculty sought to develop a curriculum that would use real world applications of math and science in the classroom and in laboratory activities. The meetings also addressed the training of the undergraduate students, and when those trainings would be held. It was also determined through collaboration with the faculty and the evaluators how the program would be evaluated, and which measurement tools would be used.

The faculty agreed that the program would be delivered Monday through Thursday from 9:00 a.m. to noon beginning Wednesday, June 11$^{th}$ until Tuesday, July 22$^{nd}$. It was determined that the program would not meet on Fridays, and that the program would be held at Aurora University in Stephens Hall as well as Dunham Hall due to the construction being done on campus to build the new STEM building.

The methodology of the evaluation focused on obtaining data from several sources in order to have a more complete "picture" of the program. The evaluators wanted to see if the kids' knowledge improved through the program; therefore, students were given a pretest on day

one that addressed the three areas of focus: matter and energy, prosthetics, and computers. It was determined to offer two posttests instead of one posttest. This decision was made in order to obtain more accurate and valid data. If students only completed one posttest, they would have had a longer time between the matter and energy material then the prosthetics and computer material. Therefore, it was determined to offer two posttests. The first posttest on matter and energy was administered on June 26th. The final posttest on prosthetics and computers was administered on July 17th; the test was given on the last Thursday instead of the last day as historically fewer students come on the last day of the program as they would on the Thursday before the last week.

In addition to evaluating the students' knowledge, the evaluators wanted to evaluate the students' attitude toward math and science at the beginning and end of the program to see if the program increased students' desire to learn more about these two subject areas. Additionally, the evaluators measured the students' satisfaction regarding the activities completed during the program. Through all of these measures, the goal was to have a more comprehensive sense as to how the program affected students' desire to learn more about math and science.

One last source of assessment data included the feedback from the teachers. The evaluators conducted two group interviews, one with the Aurora University and District teachers, and one with the student teachers in order to determine how they perceived the development of the program as well as the running of the program. Their feedback is extremely important in the assessment part of the program determining what went well and which parts of the program are needed to be modified for next year.

## Quantitative Data

There were 130 students who participated in the Amazing Science Summer program. This is a substantial increase from last year, which demonstrates how popular the program has become as many students wish to learn about math and science during their summer break from school. The students are enrolled in the following districts: Aurora West SD 129, Aurora East SD 131, Indian Prairie SD 204, as well as students who participated due to their family member being a member of Aurora University staff. See Table 1 for a breakdown of the results.

Table 1: District Distribution

| District | Frequency | Percentage | Cumulative Percent |
|---|---|---|---|
| 129 | 41 | 33.6 | 33.6 |
| 131 | 23 | 18.9 | 52.5 |
| 204 | 46 | 37.7 | 90.2 |
| AU Staff | 12 | 9.2 | 100.0 |
| **Totals** | 130 | 100.0 | |

In addition, students were from four levels of education – 4th through 7th. The distribution of the students' grade levels can be seen in Table 2. As can be seen, most of the students are enrolled in either the 4th or 5th grade (71%); only 30% of the students are from

grades 6th and 7th. This information may help those who recruit and manage the program determine if they wish to recruit students from grades 6th and 7th for next year's program.

Table 2: Grade Level

| Grade | Frequency | Percentage | Cumulative Percent |
|---|---|---|---|
| 4th | 47 | 37.9 | 37.9 |
| 5th | 41 | 33.1 | 71.0 |
| 6th | 26 | 21.0 | 91.9 |
| 7th | 10 | 8.1 | 100.0 |
| **Totals** | 130 | 100.0 | |

As can be seen in the following table, there were more males than females who participated in the program. It is unclear why certain students did not check a specific gender, which led to six students not being classified as either male or female.

Table 3: Gender

| Gender | Frequency | Percent | Cumulative Percent |
|---|---|---|---|
| Female | 49 | 37.7 | 37.7 |
| Male | 75 | 57.7 | 95.4 |
| Other | 6 | 4.6 | 100.0 |
| Totals | 130 | 100.0 | |

The races were fairly evenly divided between White/Caucasian, Hispanic/Latino, and Asian American. There were few students who self-identified as African American, and it may be helpful to compare the numbers of the program with the school districts' statistics to determine if more of an effort to recruit African American students is warranted.

Table 4: Race/Ethnicity

| Race/Ethnicity | Frequency | Percent | Cumulative Percent |
|---|---|---|---|
| White/Caucasian | 34 | 26.2 | 26.2 |
| Hispanic/Latino | 40 | 30.8 | 57.0 |
| African American/Black | 10 | 7.7 | 64.7 |
| Asian American | 38 | 29.2 | 93.9 |
| Other | 8 | 6.2 | 100.1 (Rounding Error) |
| | 130 | 100.1 (Rounding Error) | |

**Pretests and Posttests**

To evaluate whether the program increased students' level of knowledge regarding the three topic areas: matter and energy, prosthetics, and computers, students completed one pretest and two posttests to measure their knowledge. The test was developed by the faculty members and evaluators based on the unit contents. Through discussion it was decided to include a response of "I don't know" to each question so that students could select that answer instead of

guessing on an answer, which might affect the validity of the test. The test was administered on the first day of class, June 11, 2014. The evaluators scored the pretest, and the results of these data are presented in Table 5.

Table 5: Pretest Scores

| Pretest | Pretest Mean | Standard Deviation | Standard Error Mean |
|---|---|---|---|
| Matter and Energy | 4.33 | 1.76 | .20 |
| Prosthetics | 4.78 | 1.45 | .15 |
| Computers | 2.33 | .83 | .08 |

As stated, students completed two posttests; one test focused on matter and energy, and the other posttest focused on prosthetics and computers. The first posttest was administered on June 26, 2014, and the second posttest was administered on July 17, 2014. The results of these data are presented in the following table.

Table 6: Posttest Scores

| Posttest | Posttest Mean | Standard Deviation | Standard Error Mean |
|---|---|---|---|
| Matter and Energy | 6.45 | 1.90 | .22 |
| Prosthetics | 6.30 | 1.58 | .16 |
| Computers | 2.67 | .64 | .06 |

Paired-samples t-tests were conducted on all three areas. Results indicate that there was a statistically significant degree of improvement in knowledge between pretests and posttests. As indicated in Figure 2, the mean for matter and energy improved from 4.33 (1.76) to 6.45 (1.90) during the course of the program. This change is measured as statistically significant $t(77) = -10.627$, $p < .001$. As indicated in Figure 2, the mean for prosthetics improved from 4.78 (1.45) to 6.30 (1.58) during the course of the program. This change is measured as statistically significant $t(98) = -9.032$, $p < .001$. As indicated in Figure 2, the mean for computers improved from 2.33 (.83) to 2.67 (.64) during the course of the program. This change is measured as statistically significant $t(98) = --4.170$, $p<.001$. Finally, as indicated in Figure 2, the mean for the overall pretest/posttest improved from 12.48 (2.97) to 16.13 (3.79) during the course of the program. This change is measured as statistically significant $t(80) = -9.493$, $p < .001$. Therefore, the data demonstrates that the kids' knowledge of these three topic areas changed statistically during this program.

**Attitude Responses**

In addition to evaluating the students' knowledge, the evaluators measured the students' responses regarding their attitudes of math and science from the beginning of the program compared to the end of the program to determine if their perceptions of learning about math and science changed while being part of the program. Fifteen questions were asked of them such as: 1. Learning about math and science is fun, 2. Learning about math and science is interesting, 3. I would like to do research when I grow up, 4. I feel nervous when someone talks to me about math and science, etc. For a list of all of the questions, refer to Table 5. The questions were scored using a 5-point Likert scale, where 1 = Strongly disagree, 2 = Disagree, 3 = Do not

disagree or agree (No opinion), 4 = Agree, and 5 = Strong agree. There was no statistical significance between the first day of the program and the end of the program in students' level of attitude toward learning about math and science. It appears that the program itself did not change the students' attitude toward learning about math and science, yet this seems logical as students already scored quite highly on the majority of the attitude questions. For the last three questions, they are reverse scored, so lower scores indicate that the students were not nervous regarding learning about math or science, and they believe they can learn about these two topic areas. Using the data, the evaluators recommend formulating survey questions and questions for future group interviews to gather more detailed explanations for the students' responses. Table 7 presents the data from the questions in rank order from the highest scores to the lowest scores using Pretest Scores.

Table 7: Attitude Scores

| **Attitude Question** | **Mean – Pretest<br>Mean – Posttest** | **Standard Deviation** | **Standard Error Mean** |
|---|---|---|---|
| Learning about math and science can help someone get a good job | 4.5625<br>4.5729 | .61237<br>.67660 | .06250<br>.06906 |
| Math and science are important because they help to improve people's lives | 4.3404<br>4.4681 | .79722<br>.69873 | .08223<br>.07207 |
| Learning about math and science is interesting | 4.3333<br>4.3118 | .78482<br>1.05272 | .08138<br>.10916 |
| I would like to learn more about math and science | 4.3263<br>4.2105 | .80480<br>.99888 | .08257<br>.10248 |
| Learning about math and science is fun | 4.3053<br>4.1368 | .81311<br>1.05800 | .08342<br>10855 |
| I look forward to learning about math and science | 4.2421<br>4.1263 | .83431<br>1.03392 | .08560<br>.10608 |
| I would like to have a job using math and/or science | 4.0208<br>3.9271 | .89418<br>1.19864 | .09126<br>.12234 |
| Learning about math and science is easy for me | 3.8542<br>3.9583 | .98386<br>.99384 | .10041<br>.10143 |
| Learning about math and science is important | 3.5938<br>3.7188 | 1.03189<br>1.10218 | .10532<br>.11249 |

| | | | |
|---|---|---|---|
| because it helps me to be healthy | | | |
| I would like to do another program about math and science in the after-school program once this one is finished | 3.4792<br>3.5625 | 1.15147<br>1.23810 | .11752<br>.12636 |
| I would like to do research when I grow up | 3.4583<br>3.3958 | 1.06540<br>1.19190 | .10874<br>.12165 |
| I would like to teach about math and science when I grow up | 2.6842<br>2.7579 | 1.05451<br>1.23526 | .10819<br>.12674 |
| When I think about learning about math and science I feel nervous* | 2.1563<br>2.0938 | 1.12697<br>1.14320 | .11502<br>.11668 |
| I feel nervous when someone talks to me about math and science* | 1.9792<br>1.7813 | 1.03598<br>1.00737 | .10573<br>.10281 |
| No matter how hard I try, I cannot understand math and science* | 1.4896<br>1.5000 | .72540<br>.89443 | .07404<br>.09129 |

*Questions with an asterisk (the last three responses) are reverse scored, so a lower score shows a higher ranking.

**Satisfaction Responses**

Students were asked to provide feedback on the activities conducted during the program. For each activity they provided feedback on their learning as well as feedback whether they had fun. The Likert scale was 1 to 5, with 1 = Strongly disagree, 2 = Disagree, 3 = Do not disagree or agree, 4 = Agree, and 5 = Strongly agree. The results are reported below.

Table 8: Satisfaction Scores for both Learning and Fun

| **Activity** | **Mean** | **Standard Deviation** | **Standard Error Mean** |
|---|---|---|---|
| Rubber Band - Learned | 3.71 | .99 | .09 |
| Rubber Band – Fun | 4.25 | .98 | .09 |
| Windmill – Learned | 4.11 | .86 | .08 |
| Windmill – Fun | 4.33 | .92 | .09 |
| Electric Motor – Learned | 4.42 | .85 | .08 |
| Electric Motor – Fun | 4.40 | .92 | .09 |
| Model Engine – Learned | 4.28 | .88 | .09 |
| Model Engine – Fun | 4.31 | 1.11 | .11 |
| SciTech Trip – Learned ($4^{th}$ and $5^{th}$) | 4.26 | 1.09 | .13 |
| SciTech Trip – Fun ($4^{th}$ and $5^{th}$) | 4.55 | .99 | .12 |
| Waste Mgt Trip – Learned ($6^{th}$ and $7^{th}$) | 3.73 | 1.12 | .11 |
| Waste Mgt Trip – Fun ($6^{th}$ and $7^{th}$) | 3.45 | 1.32 | .13 |
| Programming Scratch – Learned | 3.91 | .97 | .10 |
| Programming Scratch – Fun | 4.28 | 1.07 | .11 |
| Chicken Wings – Learned | 3.58 | 1.23 | .13 |
| Chicken Wings – Fun | 3.39 | 1.55 | .16 |
| Prosthetic – Learned | 4.28 | .88 | .09 |
| Prosthetic – Fun | 4.39 | .94 | .10 |
| Computers – Learned | 4.18 | .98 | .10 |
| Computers – Fun | 4.53 | .80 | .09 |

For clarity in understanding the data, the activities were ranked using the two areas: learning and fun. See tables below.

Table 9: Satisfaction Scores for Learning

| **Activity – Learned** | **Mean** |
|---|---|
| Electric Motor | 4.4182 |
| Model Engine | 4.2843 |
| Prosthetic | 4.2842 |
| SciTech Trip (4th and 5th Grades) | 4.2647 |
| Windmill | 4.1081 |
| Programming Scratch | 3.9167 |
| Waste Management (6th and 7th Grades) | 3.7320 |
| Rubber Band | 3.7130 |
| Chicken Wing | 3.5870 |

Table 10: Satisfaction Scores for Fun

| **Activity – Fun** | **Mean** |
|---|---|
| SciTech Trip (4th and 5th Grades) | 4.5507 |
| Electric Motor | 4.4037 |
| Prosthetic | 4.3854 |
| Windmill | 4.3333 |
| Model Engine | 4.3137 |
| Programming Scratch | 4.2813 |
| Rubber Band | 4.2523 |
| Waste Management (6th and 7th Grades) | 3.4536 |
| Chicken Wings | 3.3913 |

As can be seen from the data, students were highly satisfied with many of the program's activities. Using a Likert scale of 1=Strongly disagree, 2=Disagree, 3=Do not agree or disagree, 4=Agree, and 5=Strongly Agree, students scored most of the activities between a 4-5. Specifically, with regard to satisfaction related to their learning, they scored Electric Motor, Model Engine and Prosthetic as the top three, and Chicken Wing, Rubber Band, and Waste Management field trip as the bottom three. Chicken Wing had the lowest score, but it was still above an average rating. What is interesting were the scores related to having fun; students scored all but two activities above a 4, with only the Waste Management field trip and the Chicken Wings activity having scores below a 4. It seems that students enjoyed the activities provided throughout the Amazing Science Summer program, and in addition they perceived the activities to be helpful in their learning of the material. This seems to be a testament to the developers of the program; by creating fun activities, students were able to learn the material.

## Observations of Classrooms

The evaluators observed the kids as well as talked with them on two occasions – approximately halfway through the Program and at the end of the Program. From the observations the following themes emerged: kids had lots of fun; and teachers, both student teachers as well as district/university teachers were well prepared. The feedback from the kids will be presented after the observation data.

During the observations, the evaluators observed how prepared the teachers were for their classes. Specifically in one class, the university teacher was on vacation so the student teachers were in charge of the class. We observed that both student teachers had a plan of action for the day, and that the two of them worked very well together. For example, one student teacher was informing the kids as to what the project would entail and what the kids would need to do, and the other teacher was handing out the supplies and providing more "hands-on" direction. The activity for the day was creating Edible Landfills, which related to their trip to Waste Management. During the activity, some kids were quieter than others, but many of the kids were talking and helping each other with the activity. Furthermore, the student teachers did a great job with the Q & A part of the activity explaining further the reason for the activity. At the end of the activity, the kids could eat their "creations" of the many sugary items, yet the kids often reported that the "creations" were inedible. They seemed to think this funny, as individually they liked each of the food items. This activity addressed the topic of composting, and one kid said, "I feel bad for the garbage." This comment seems to show that the kids were learning that composting and recycling are important for us to have a sustainable world.

We then observed the second classroom and noticed a difference in energy. This classroom had a district teacher as well as student teachers. We noticed that the district teacher was very comfortable in front of the students and was louder with more energy; she also seemed to be in more control. By having student teachers with district/university teachers, this seems to be a wonderful way for student teachers to become more comfortable taking the lead in a classroom and for teachers to model classroom management for the student teachers. Feedback from the student teachers, which will be provided later in this report, stated it may be beneficial for the student teachers to rotate from teacher to teacher in order to see multiple ways of managing a class and working with kids. This program is not only beneficial for the kids enrolled, but also for the student teachers as they learned about how to effectively use classroom management as well as professional skills that will benefit them in any future work experiences. Finally, in both rooms, we observed how all the teachers knew the students' names, which provided a more sure and comfortable environment in the classroom.

In addition to the evaluators' observations, the kids provided the following feedback on what they liked and disliked about the program. Kids spoke highly about the program overall, and that they were learning and also having fun. Specifically they said they had fun at the SciTech field trip, as it was "fun and informational." The kids also reported they enjoyed the class projects such as creating windmills and the rubber-band cars and building the model engine. The 6$^{th}$ and 7$^{th}$ grade students who attended the field trip to Waste Management stated the trip was not as fun or as informational as it could have been. They reported that it was a long ride to the facility, which in turn gave them very little time to learn about the company and about

how waste becomes energy. The evaluators recommend that in the future this trip be given a longer time frame so students can see how waste becomes energy.

Students provided feedback and suggestions as how the program can be improved. They suggested the following changes for next year.

1. Do a raffle at the end of the program to raffle off the items they made. As many of the projects were completed in small groups, the students were unable to take home their projects to show their families. It may be beneficial for students to create some individual projects as well as group projects. For the group projects, using a raffle at the end of the program would allow some students to take home their completed work.
2. Another suggestion was to have smaller projects completed that led to one larger project. This is a possible idea, but much thought and planning by the faculty would need to be done to make this a reality.
3. Another suggestion focused on more time outside to play and do projects, because several students said, "sitting in class is like being in school."
4. With regard to field trips, students suggested a field trip to the Museum of Science and Industry.
5. As to other possible topics for future Amazing Science Summer programs, students stated: learn about "more revolutionary" ideas such as the steam engine. Several students suggested they learn more math, and other students suggested they learn about the stars and constellations and go on a field trip to the Planetarium.

As can be seen from the comments, students enjoyed the program and became so involved they had some very helpful ideas for future Amazing Science Summer programs.

**Feedback from Teachers (District and AU)**

The evaluation team met with the district and Aurora University faculty to discuss their thoughts and perspectives regarding the Amazing Science Summer program. From the discussion several themes emerged: teachers work well together, there needed to be more preparation time, they could have benefitted by better communication, the technology could be better, and the student workers were wonderful.

The first theme related to how well the teachers worked together to develop the program. They reported that the "different knowledge bases" of the faculty allowed them to develop a program that they believed was a success. The evaluators observed the various knowledge and skills that the faculty members possess during the organizational meetings where each faculty member shared ideas and suggestions as to what topics they could teach during the program. One person stated, it [the program] was a "blank piece of paper" at the beginning, and they had to determine "which crayons to use". This "blank piece of paper" was seen as both a positive and a negative. It seems that the faculty were able to create a new and innovative program, but that this also created stress as they were not sure how to proceed. By the end of the program, the faculty stated that they were proud of what they had accomplished even if it was a bit anxiety producing.

The second theme of needing more preparation time relates to the above theme. As the faculty members were creating a new program, they reported they wished they had more time to do so. Several related comments were: 1. "I wish we had more structure in the planning meetings," 2. "We needed agendas for the meetings," 3. "There was no guide for the program," 4. "Planning – not enough time." It is clear from the comments that the faculty wished they had more structure and time to plan the program, but the other side of this is that with too much structure they may not have had the opportunities to be so creative with the curriculum.

A third theme related to communication between the university faculty and the district teachers. The district teachers reported that "Google docs worked okay, but documents were not always posted to Google on time or early." Another person stated, "Everyone needs to be part of Google docs" and "we need training on how to use Google docs." A suggestion for next year would be to have the student teachers also be a part of the Google docs so they would have access to the materials just as the university and district teachers did. The theme of organization and time came up again with responses focusing on providing information upfront, e.g. a few days before doing activities.

A fourth theme was better technology. Responses included comments regarding having updated materials such as computers using the same operating system. One person stated the 60 computers they were using covered five years of technology. They also stated they are aware of financial constraints, but wanted to see what could be done.

A final theme addressed the student teachers. Responses included: "thumbs up," and "very good." One person said that a student teacher took initiative and created a service plan. Others said the student teachers were more like colleagues than student teachers. It seems as if all the teachers worked well together to implement the best possible program for the kids.

There are several suggestions that relate to the above stated themes. One suggestion would be to have the students/kids cycle through each professor instead of having one teacher teach the entire curriculum. This would allow the teachers to teach material that fits with their expertise. Along with this suggestion, the kids and the student teachers would stay together, but the professors would change rooms and topics; this would allow for consistency for the kids. It was also suggested that the program be held at one of the district schools rather than Aurora University as the district schools have lots of supplies such as computers, scissors, etc. Yet another person said that having the program at AU allows students to come to a university campus, and that some of the kids may never have that opportunity again. Another stated that having kids come to the university might allow the kids to see they could go to college. Another suggestion related to money; the person suggested the program charge more money to attend, and another suggestion stated there could be one cost for the Program, and separate costs for the field trips. A final suggestion related to beginning the planning process earlier, and to have more structure during those meetings.

## Notes from Student Teachers

The evaluators met with the student workers on the last day of the program to obtain their feedback regarding the program. Several themes emerged from the focus group: great time with the kids, program needed to be better organized and needed better communication, provide more training to the teachers, and the student teachers worked well with the university and district teachers.

The first theme related to how much fun and enjoyment the student teachers had with the kids. This was "hands down" the most positive feedback from all the student teachers. When asked what they liked the most, they all said they had a great time teaching and interacting with the kids.

There was a similar theme from the student teachers as from the university and district teachers – the program needed to be better organized as well as needed more communication. The student teachers said they often received information at the last minute, and that "lots of emails [were] sent the morning of". As stated earlier, this may be resolved by including student teachers on the Google docs platform. One student stated, "No hard copies of lesson plans – only electronic". This is an interesting comment by the student teacher as one goal was to be more "green". A future goal is to think how the program can provide materials to student teachers ahead of time by using electronic technology.

In terms of planning, it was also suggested that more teachers be trained on how to provide snacks. Specifically, one person said that one student teacher was on vacation, and the person who remained at the program was the only "snack provider."

The student teachers also said there needed to be better organization regarding which parents had paid for the field trips and which parents had not; they suggested this concern could have been addressed if the Check-in on day one was better organized.

Another comment focused on the location of the classrooms. The student teacher stated, it would be "Helpful if all classrooms were in the same building". This concern may be addressed next year, as there is the new STEM building, which may be a place to hold all of the students.

It seems all of the feedback was summed up well by a few student teachers who had been a part of last year's program; they stated many of the challenges this year were due to "growing pains" as the number of kids attending this year was much larger than last year.

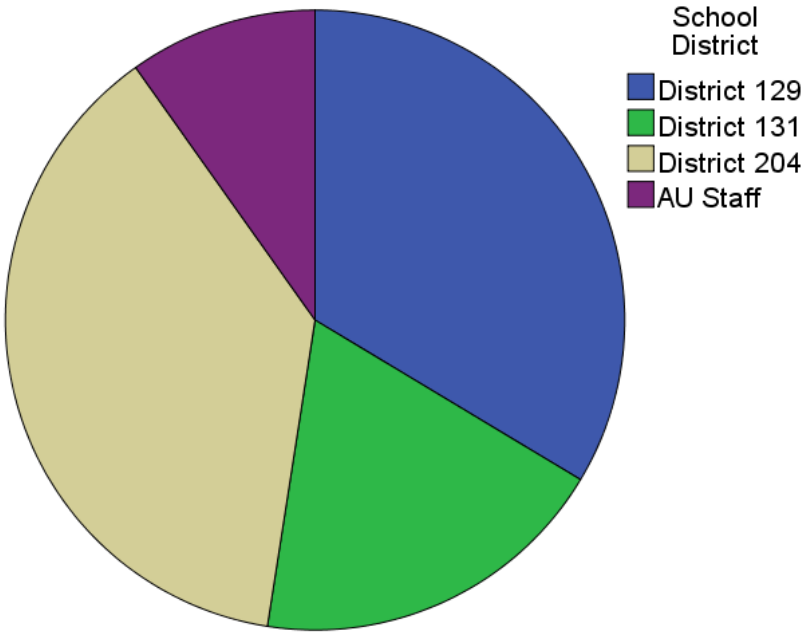
Student teachers provided several suggestions as how to improve the program. One suggestion was to improve communication by having morning meetings so that everyone would be "on the same page" for the day. Another suggestion focused on future field trips such as the Aquarium, the Museum of Science and Industry, and if needed make the cost of the field trips separate from the cost of the program so kids could experience trips to Chicago. Another suggestion focused on making the last day of the Program a "fun day". A final suggestion focused on having projects where kids could take home their work as many of the projects were group projects and the kids were unable to take home their work to show their families.

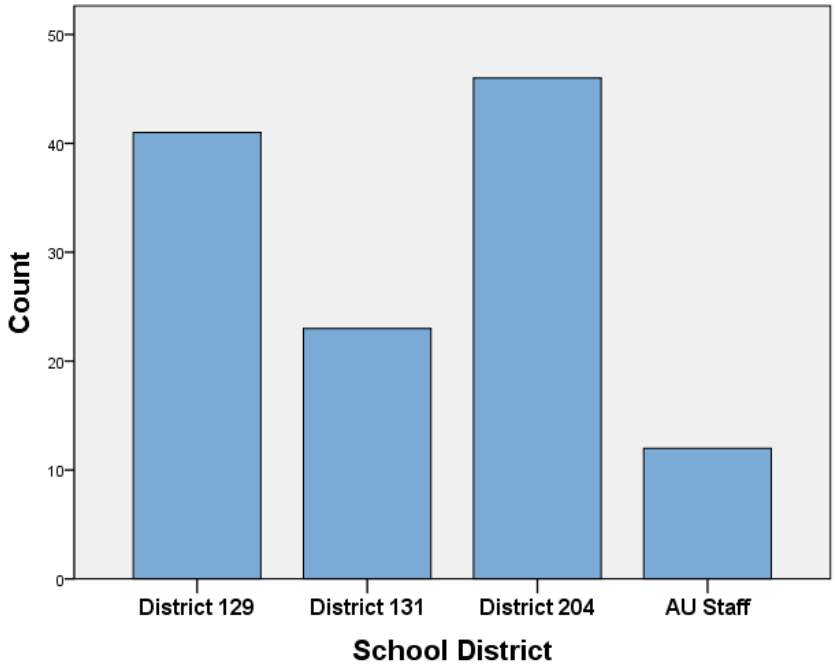
## Final Summary

One parent sent an email that seems to sum up the program very well. The parent stated that her daughter was attending the program and thoroughly enjoying the summer camp program. The mother continued by stating that the lawnmower at home would not start, and her daughter said she would work on it and get it started as the daughter had recently learned about a "4 stroke motor" during camp. The mother wrote, "We loved it! Today she is all excited and I can't wait to get home to see the prosthetic leg they made." This message from the mother shows that the knowledge and skills that the kids are learning are applicable to real world challenges, and what is more important is how the daughter was able to apply her knowledge outside of the classroom.

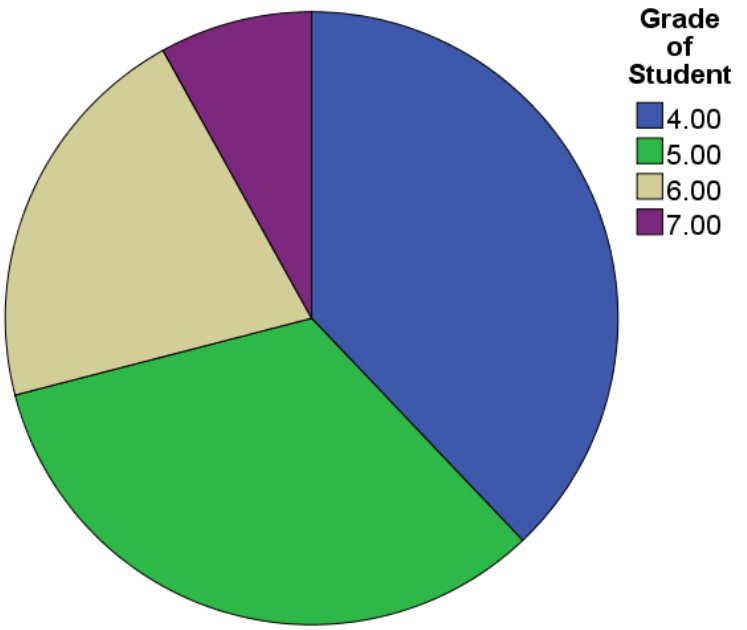
It appears the program was a success as measured by satisfaction, attitude, and learning. There were statistically significant changes from pretests to posttests, and the kids provided high scores for attitude and satisfaction. Through discussion with the kids, they did not seem aware of any of the challenges reported by the teachers, which clearly shows professionalism among the university, district, and student-level teachers. It seems that what might make the program more beneficial for everyone is a little more planning. Beginning the planning phase earlier in the year would provide time for instructors to brainstorm ideas, and then practice their implementation before the program begins. Another suggestion is more communication between the developers of the activities and the student teachers, so that everyone has knowledge and skills to implement the activities in class. No program is perfect, but it seems that the Amazing Science Summer program achieved its goals of educating kids on matter and energy, prosthetics, and computers, and did this while creating an atmosphere that was fun and energetic.

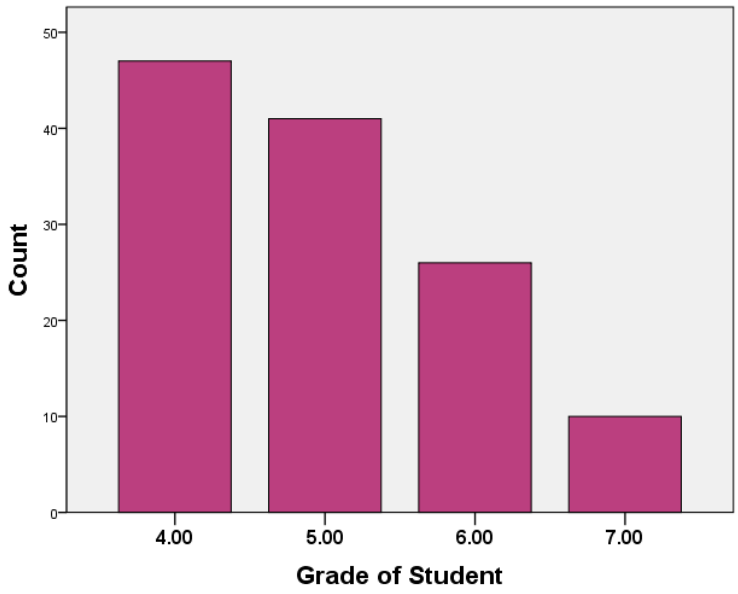
# School District



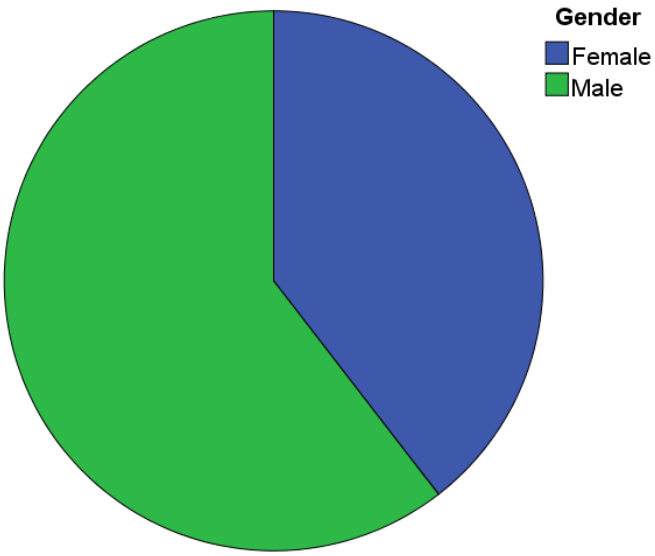



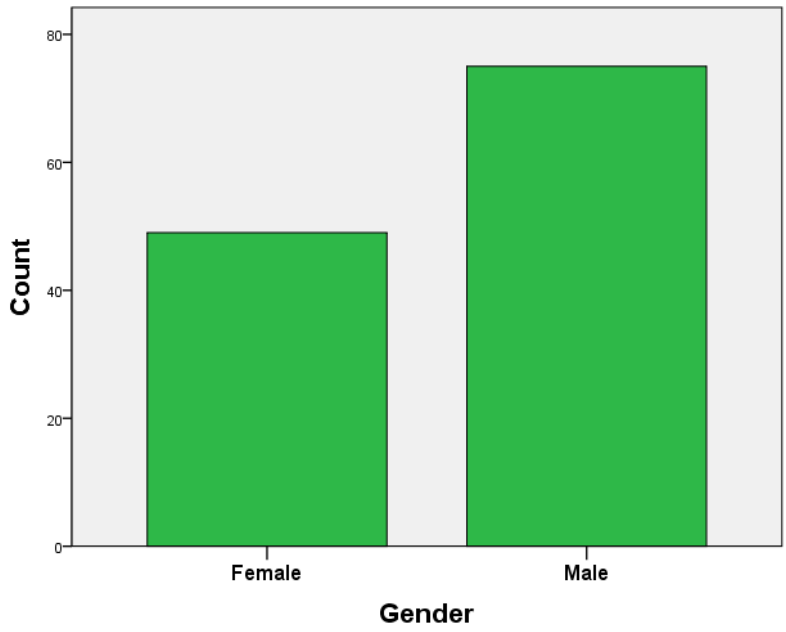
# Grade of Student



# Gender



# Race and Ethnicity