Third Street Alliance STEM Program: A Scientific Initiative for the Children of Easton
Sonia Bhala, Tanina Cadwell, Allison Mitzak, Andrea Rastelli, Owen Robinette, and Nicholas Staudinger

INTRODUCTION
As of Friday, February 6, 2015, Third Street Alliance Learning Center’s after-school program has brought hands-on STEM (science, technology, engineering, and mathematics) related activities into their curriculum. Every Friday, each child has the opportunity to engage in hands-on science labs, watch science demonstrations, or interact with guest speakers who work in STEM fields. They have and shall continue to learn new science and mathematical concepts and are now given an opportunity to practice various aspects of scientific inquiry, including identifying problems, asking questions, researching, formulating hypotheses, and experimentation.

Children will have the opportunity to interact with volunteer STEM educators, currently pursuing bachelor’s degrees in STEM fields. They will be encouraged to not only participate in hands-on lab experiences and math games with the assistance of these educators, but also will be given a chance to discuss and reflect on what they’ve learned. Every month of the program will have a different theme. Our volunteer STEM educators strive to serve as positive role models and mentors for the students and work towards teaching new science and math concepts in the most enriching and enjoyable way possible.

MONTHLY THEMES AND WEEKLY SCHEDULES

February’s Theme: Health Heart Month
02.13.15 “Anatomically Correct Valentines”
02.20.15 “Heart Chocolate Math”
02.27.15 “Making Plasma Soup”
March’s Theme: Weather and the World
03.06.15 “Thermometers: Measuring Temperature”
03.13.15 “Tornado In A Jar”
03.27.15 “Guest Speaker: The Aerodynamics of Airplanes”
April’s Theme: Our Role In Nature
04.04.15 “Save the Bay from an Oil Spill!”
04.17.15 “Guest Speaker: Nature Nurture Discussion”
04.24.15 “Water Pollution and the Delaware River”

EXPERIMENTAL LESSON PLAN
March 27, 2015: Delta Wing Glider and Scientific Inquiry

Objective: Students will learn how to change the flight characteristics of a glider, learn the aviation terminology, and create an experiment to build their own “Super Glider”

Background
There are many types of vehicles used to transport people and objects from one place to another on Earth. These vehicles are guided by a driver. Turning the steering wheel changes a car’s direction. The rudder is used to control the direction of a boat. A pilot’s use of the control wheel is used to control the direction of an airplane. A plane’s wings are another way the direction of a glider can be controlled. The more wing area, the greater wind resistance on the wing and the greater the glider’s downward force. The glider will then change direction.

In this experiment, the students will learn to control the direction of a glider by changing the shape of the wing grip. The student will first view and feel the standard Delta Wing Grip and the different Delta Wing Grip templates. They will then draw the wing grip on both sides of the paper. The student will choose a different type of wing grip to test, and cut along the solid lines to create the new wing grip. The students will be able to change the direction of the wing grip by changing the wing grip’s shape. This can be used in several ways:

1. As a tool to change direction of the glider
2. As a tool to change speed of the glider

Each student will be given a Delta Wing Grip to change the shape of the wing grip. The students will then be given a different type of wing grip to create and cut along the solid lines. Each student will then be given a new Delta Wing Grip to change the direction of the glider.

Lesson plans are designed to accommodate auditory, visual, and kineesthetic learners. At the beginning of each session, a video related to the day’s lesson is displayed, and students are asked to repeat some of the facts and answer contextual questions to further understand the video. Following the visual, students are given a kinesthetic project and asked to approach the project with a scientific perspective. When asked questions throughout the lesson, mentors are able to understand which students prefer which style of learning, and can then tailor their teacher to that individual’s strengths and weaknesses.

CONCLUSIONS AND EXPECTATIONS FOR FUTURE COLLABORATION

February 20, 2015: “Heart Chocolate Math”

By the end of the term, we hope to provide a well-funded and well-organized program for the children of the Third Street Alliance after-school program. Our aspiration is to involve a number of science based leaders of the Easton community, incorporate a larger number of volunteers in our program, and provide the children with a fun and engaging experience.

We additionally hope to study the overall effectiveness of the group by providing an observational survey or a survey pre- and post- semester long program. By doing so, we shall be able to curtail our lesson plans towards what works most effectively for the students in the program.

Figure 1: One of the STEM Mentors creating a hands-on learning experience that involves circulation and the blood's pathway through the body. Children were taught new terminology like arteries, veins, plasma, platelets, white blood cells, and red blood cells for a deeper comprehension of the blood's role in our body.

Figure 2: Mentor assisting further with a student’s math and science homework. Our mentors go beyond lesson plans to encourage students to pursue science in and out of the classroom, and are eager to help in any facet available.

Figure 3: Older students of the after school program gathered around a table to solve math problems with Sour Patch Kids.

Figure 4: Mentor creating our “Plasma Soup” for a kinesthetic and visual learning experience that also provided contextual comprehension in the shape of food. Plasma, red blood cells, white blood cells, and platelets were all represented in accordance to the percentage of the blood they compose.

Figure 5: Mentor demonstrating the difference between the two types of blood. Oxygenated blood (blue).

Figure 4: One of the students in the mentorship program, coloring his anatomically correct heart for Valentine’s Day. Many students also illustrated which pathways had oxygenated (red) and un-oxygenated blood (blue).

CURRENT STAFF
Alisa Baratta-Executive Director of Third Street Alliance Brooke Minman- Director of Research and Development Ana Babei- Director of Learning Center Tina and Denise- Learning Center Staff
Sonia Bhala- Founder/Director of STEM Program, Program Co-Coordinator and Volunteer STEM Educator Nina Cadwell- Program Co-Coordinator and Volunteer STEM Educator
Volunteer STEM Educators: Allison Mitzak, Andrea Rastelli, Owen Robinette, and Nicholas Staudinger