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4-1-2018

# STEM at Stead: Bringing STEM to the UI Stead Family Children's Hospital

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## STEM at Stead: Bringing STEM to the UI Stead Family Children’s Hospital

The average length of stay of pediatric patients at the UI Stead Family Children’s Hospital is 9.96 days. As a result of their extended or frequent visits to the hospital, pediatric patient often can miss key lessons in school that ultimately inspire higher learning in STEM.



Figure 1: View of Kinnick Stadium from the 12th floor of the University of Iowa Stead Family Children’s Hospital. This image was taken from inside the program event room, the Pressbox Cafe.

For my outreach program I brought a variety of STEM activities to the pediatric patients in the form of ‘Science Nights’. The target audience of this project was 3rd to 5th grade, however each activity done during these programs was carefully chosen to be applicable to children of all ages.




Figure 2: The Press Box Cafe in the UI Stead Family Children’s Hospital. The location where the event nights were hosted.



Through my project, I hope to provide an experience in which children can explore STEM by running the experiments themselves, much like what they would experience if they were in a science lab course. With the help of other student volunteers and the generosity of local partners, I hope to inspire these children to learn more about science.

Figure 3: Image from the first event, the engineering night. Pictured is a participant testing out his paper airplane.

I began by using online resources, such as Pinterest, as well as colleagues to choose activities and break them down into different disciplines. I then reached out to Kathy Whiteside, a Child Life Specialist at the hospital. I worked closely with Kathy, to order supplies and choose dates for the events. Bringing events to the hospital is very structured. The hospital had already set blocks of time for events. I chose to host the events on Thursday evenings at 7 pm. Advertising for the event was done by Child Life. Handouts were created for each activity outlining the supplies needed, instructions as well as questions to ponder and notes for leading the activity. Each of the handouts were reviewed by Dr. Mark McDermott from the College of Education. An example handout is displayed in figure 4.



## Ice cream

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**Supplies Needed:**

- ½ cup- salt
- 4 cups- ice cubes
- 2 tablespoons- sugar
- 1 cup- whole milk
- 1 teaspoon- vanilla extract
- 1 gallon storage bag
- 1 quart storage bag
- Optional: Chocolate chips, chocolate syrup, caramel

**Instructions:**

1. In the quart size bag (smaller one) add the ice cream ingredients. Add the milk, sugar and vanilla.
2. Tightly zip up the small bag and place it inside the larger bag.
3. Add the ice cubes and salt into the larger bag and zip it up.
4. Shake the bag consistently for about 10 minutes or until your ice cream hardens.
5. Place the ice cream into a bowl or onto a cone and add your favorite toppings.
6. Enjoy your treat!

**What did you learn?**  
Freezing point is the temperature at which a liquid turns into a solid. The freezing point for pure water is 0 degrees Celsius. The salt lowers the freezing point of water and this allows the mixture to get colder. Since this mixture is very cold it freezes the liquid milk mixture and it turns into a delicious treat!

**Now that you know what freezing point is, what is meant by the term melting point?**

Photo obtained from [www.marthastewart.com](http://www.marthastewart.com)

Figure 4: Example handout. This handout was used to direct volunteers and parents through helping the kids make ice cream as an activity for chemistry night. Every handout is outlined in a similar fashion, it includes a title of the activity, picture of end result or science behind it, supplies needed, instructions and a “what did you learn” section.

I began this project with pediatric patients in the UI Children's Hospital as my target audience. After the first night, Engineering night, I broadened my target audience to include the siblings



and friends of the patients as well. Not only does this audience encourage the attendance of my original audience, they also often miss school to spend time with their loved ones during their stays at the hospital.

Figure 3: The reaction on a patient's face after watching the 'volcano' explode! He proceeded to try different combinations of vinegar and baking soda to make the 'biggest' volcano. Image taken during the geology night.

Six event nights were held approximately every other week. The disciplines covered in these nights were engineering, geology, physics, biology, astronomy and chemistry. Each night consisted of three hands-on activities led by my volunteers and myself. For geology night, the Science Booster Club helped us include a fossil exhibit and a stargaze activity was made possible through collaboration with physics students.

A total of 24 patients and 38 family and friends participated in the event nights. A survey for each activity was used to gauge the effectiveness of the activity to engage the participant. The survey was created using a variety of emojis that stimulate a emotion towards an activity. A small description was written below each emoji and can be seen in figure 4. In my first iteration of this survey the second emoji was the 'nerd' emoji or the emoji with glasses. This emoji was replaced with the one currently seen because of feedback from my volunteers who thought it was interfering with results as the kids had a strong liking to that specific emoji. One volunteer was told, "I loved this activity but the nerd emoji is my favorite."



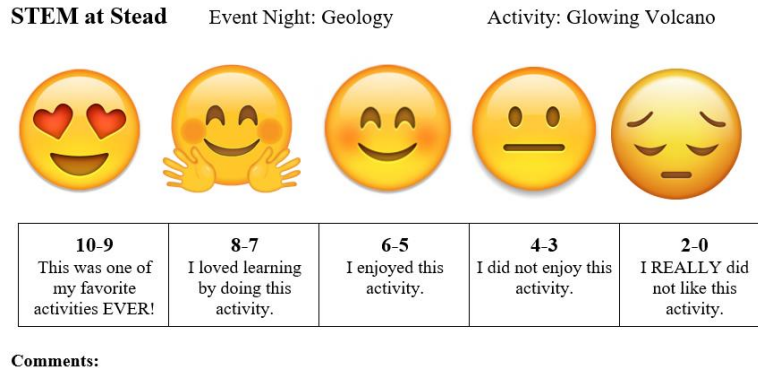


Figure 4: Happy Face Survey example. These surveys were created for each individual activity and used to gauge the success of the activity.

All of the activities showed strong results with most participants choosing either the first or the second emoji to describe their feelings for the activity. Figure 5 displays the results of the surveys. Surveys were not given to every participant due to inconsistent distribution by the volunteers.

Event Night	10-9	8-7	6-5	4-3	2-0	Total
Engineering	2	4	0	0	0	6
Geology	4	4	1	1	0	10
Physics	5	1	2	0	0	8
Biology	9	3	2	0	0	14
Astronomy	7	1	1	0	0	9
Chemistry	9	2	0	0	0	11

Figure 5: Results from the Happy Face Surveys per event night.

I gained a lot from this project. Not only was I given the opportunity to share my love science, I was able to create connections with others on campus. There were few hurdles that could not easily be overcome by reaching out for assistance from others. I found support from my peers as well as faculty around campus. This collaboration was without a doubt the key to making this project successful. My ultimate goal for this project was to create a foundation for a sustainable program that will foster continued exploration of STEM for pediatric patients at the UI Stead Family Children’s Hospital. I believe I was successful in doing so as seen by the number of individuals that have already dedicated time to making STEM at Stead a reality. I am excited to see how this program grows long after my graduation.