Building a Replicable STEM Field Day

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INTRODUCTION

Everywhere you turn in youth academic circles, the acronym STEM jumps out at you. Standing for Science Technology Engineering and Math, this acronym is symbolic of the American education system's push to get today's youth prepared for 21st Century job skills which purportedly will value these high-level technical skills. Because American students are way behind other industrialized nations[3] in these fields, everyone is throwing a dart at the STEM board.

Whereas some educators have found quality mechanisms for providing STEM education in summer camp settings[1] and continuous formal education environments[4], providing these events in one-day settings has been less intuitive. Most single day events are provided by technology and energy development companies which present certain corporate biases for the students to muddle through.

With the financial support of a local foundation donor and participant support of a county-wide school system, the educator team set out to offer a replicable STEM field day. This poster describes the four priority areas the team determined as success markers. Camp directors, non-formal educators, and STEM enthusiasts will benefit from these discoveries.

Students participate in an engineering challenge during Cooperative Games class. Led by a Ohio 4-H Specialist, these students developed problem solving and communications skills.

PRIORITY #1: PARTNER SUPPORT

Today's public school educators face a difficult road if they wish to offer experiential education or "field trips" to their students. Administrators want to see cohesive learning. Taxpayers want to see the merits of the added expense. The teachers themselves wonder if the "break in the action" is worth disrupting the classroom's natural flow. Due to these and other barriers[2], field trips are in decline across the country.

To prevent these barriers from creating an effect, the educator team sought to make all parties happy from the beginning. Administrators were consulted regarding content standards. A local donor mitigated taxpayer concerns. Teachers were consulted with the day's design and to ensure curriculum continuity.

The result of this well considered partnership was that all parties were thrilled with the net result. One teacher even went beyond the norm and wrote a full page event summary article which the local newspaper prominently featured.

Hold on! Students participate in the element "Up Close" during Low Ropes class. Despite being initially reluctant to be physically close to their classmates, students eventually learned the various math and science skills necessary to complete the element successfully. In the picture above, they have not yet discovered the necessary concepts of leverage and balance.

PRIORITY #2: STUDENT CHOICE

With so much of today's formal education being constructed for children without their consent, the educator team felt strongly that this event should serve as an alternative. To aid this decision, each 6th grade student participant was provided with an opportunity to pre-rank their favorite field day classes. In 92% of the situations, students received their first choice. As a result, very little negative feedback about class content was received during or after the event. In addition, instructors reported strong student engagement throughout the day.

PRIORITY #3: SPECIALIZED INSTRUCTIONAL STAFF

You only have one chance to make a (good) first impression. With this mantra in mind, the educator team felt it was essential to have top-notch instructors (rather than novice volunteers) leading each class. This was accomplished by recruiting first from the ample pool of skilled Extension educators and specialists. The team was further strengthened by inviting specialists from other agencies. Finally, the event benefitted greatly by having local expert volunteers join the team—providing skills as varied as archery, kayaking, and chemistry.

PRIORITY #4: ONLY AN APPETIZER

Rather than limiting the experiences of participants, the educator team felt it was essential to offer an "appetizer" level of education such that students could be introduced to a variety of subject areas. To ensure this consistent approach, instructors were recruited under this philosophy and participated in an orientation which described the pedagogy involved.

To further enable this approach to take hold, the sessions were limited to 45 minutes in length. After the event, students and instructors both commented about "wanting more time" and wishing they could have "a week or more" to continue the learning. As intended, the philosophy clearly wetted their STEM appetites!

Course Offerings & STEM Focus

Science Cohort
- Marine Study
- Rocks and Minerals
- Wonderful World of Worms

Technology Cohort
- Don't BUG Me!
- Fire and Food
- Kayaking

Engineering Cohort
- Archery
- Cooperative Games
- Low Ropes Course

Mathematics Cohort
- Fishing and Pelts
- Secret Life of Bees
- Tree ID Hike

S T E M

Sometimes a book just will not suffice. In the case of vermiculture (the study of worms) you just have to get your fingernails caked with compost! In the picture above, students experiment during a hands-on lesson.

SUMMARY & FUTURE CONSIDERATIONS

By focusing on four key priority areas—supportive partners, student choice, quality instructors, and nimble pedagogy—the educator team designed and implemented a successful STEM Field Day for 6th grade youth. This event is easily replicable with the support of local donors, volunteers, and schools.

Practitioners are provided the following guidance when producing a similar event:

- *Start early*. Schools are not as nimble as non-formal education settings. Cutting through the red tape takes a little time.
- *Train well*. Particularly with experienced instructors, it is crucial that you orient them toward your preferred pedagogical approach.
- *Creatively engage*. STEM does not have to be a supremely difficult concept. Use the skill sets you have access to and provide a quality event. The kids will love you for it!

BIBLIOGRAPHY

1 Belczyk, C. (2014). *Bazinga! Exploring STEM at camp* [presentation]. Retrieved from NAE4-HA Conference Proceedings at www.nae4ha.com/assets/.../2014-conference-proceedings-final.pdf

2 Greene, J. P., Kisida, B., & Bowen, D. H. (March 08, 2015). The Educational Value of Field Trips. *Education Next, 14,* 1, 78-86.

3 (NCLB) U.S. Students Lag Behind Other Nations in Reading, Math, & Science Scores. (August 21, 2009). *Children & Youth Funding Report.*

4 Slavin, R. E. (2014). *Science, technology, & mathematics (STEM).*

GRATITUDE

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- *Ohio 4-H Shooting Sports*
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