EDUCATION littleBits™

LITTLEBITS EDUCATION COMMUNITY CASE STUDY

DISTRICT-WIDE STEM CHALLENGE

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ORGANIZATION
Collier County Public Schools

AGE LEVELS
4th Grade

LITTLEBITS PRODUCTS USED
Deluxe Kit, plus additional modules and accessories

DATE
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EXPLAIN HOW YOU INCORPORATED LITTLEBITS INTO YOUR PROGRAM/CLASS?

littleBits are used in our district as the elementary competition for our Annual District-wide iSTEM Competition. We are very fortunate to have Suncoast Credit Union Foundation generously sponsor the iSTEM Competition. Florida SouthWestern College donates their campus and hosts our event.

We incorporate littleBits into the curriculum through both math and science. In 4th grade science, students study forms of energy. In math, students incorporate the mathematical practice of making sense of problems and persevering in solving them and attending to precision. littleBits offers students the opportunities to engage, explore, experiment and create incorporating these standards.

We start with a full day hands-on teacher training where teachers work in collaborative groups to learn about littleBits and the building of littleBits circuits. They follow a similar process we recommend in the classroom of engage, explore, experiment and create. We emphasize the need to work as a group to problem solve and the importance of viewing "mistakes" as opportunities. We challenge the teachers to create a theme-based final project which they present towards the end of the day. We celebrate small and large accomplishments (just have to love those rolling shout-outs of success throughout the day) and talk about problem solving strategies they used as well as the importance of perseverance.

Once back at their own schools, teachers introduce littleBits to the students. We recommend using a center-based approach over a number of weeks to provide students with multiple opportunities to engage and explore the modules. Using sets of littleBits cards, students build simple modules as they learn about different sequences that create actions and are given lots of opportunities for open experimentation. Finally, students are challenged to work in randomized cooperative groups (allowing all students equal opportunity to be on a potential winning team) to create theme-based drawings of what they would create with littleBits. If time and materials allow, each team builds their creation for class-based judging or simply use the drawings and presentation by the team to choose a winning class team. We suggest that the winning team builds their creation and then creates a video of their creation and presentation. This process is repeated in all 4th grade classrooms in the school. Finally the video from each classroom are viewed, and the grade level votes for the team that will represent their school at the district competition.

The culminating district-wide iSTEM Competition is held in late spring on a local college campus. For some students, it is the first time they have visited a college campus, and the visit brings a sense of awe in and of itself. At the same time as the elementary students are competing, middle and high school STEM Competition events are also happening around the campus.

In the elementary area, thirty (30) teams of four (4) students each are gathered in a very large room. In the center of each of the 30 tables is a container full of craft materials, a littleBits kit, and a set of additional modules. The teacher advisors sit along the outside perimeter of the wall trusting that their students are well prepared for the challenge ahead. You can feel the combined excitement and energy of 120 students as they await the announcement of the theme and are given the go ahead to begin planning, designing and building.

Student teams are given 3 hours to design and build their creation based on the theme. Judges walk around and look for team work, collaboration and cooperation. Points are given for teamwork through the day as well as final project and presentation. All students on a team are expected to be able to answer questions about their project, and a final presentation is shared amongst the team. Points are even given for helping a neighboring team problem-solve. Finally each group presents their project to a team of judges. We include a “lights on” and “lights off” opportunity to each team during the judging. There is an additional 5 minutes allotted for the team to present and answer questions.

The day culminates with an awards ceremony filled with students, teachers and parents. The Superintendent awards each school based team member with a medal. The winning 1st, 2nd and 3rd place teams also receive individual trophies, a school trophy and a school cash award.

WHO WERE THE KEY PEOPLE IN YOUR ORGANIZATION THAT MADE THIS PROJECT POSSIBLE?

Dr. Kamela Patton, Superintendent
Mr. Luis Solano, Assistant Superintendent, Curriculum & Instruction
Dr. Traci Kohler, Director, STEM Resources, Instructional Technology & Media Services
Lindy George, Instructional Technology Specialist

WHAT WORKED WELL?

The overall competition was a great success. Students were so proud of their learning and accomplishments. This year we have started the process much earlier to allow more time for schools to prepare their students and have expanded the school-based competition to include all students in 4th grade for a total of over 3400 students.

A Students use the placemat to review and learn the modules that can be used in the competition.

B The students brainstorm their ideas after using the littleBits placemat to review their modules.

WHAT WAS A CHALLENGE?

The biggest challenge continues to be the ability to have enough kits for each school to have maximum hands-on opportunities. With that said, we are creative and brainstorm with schools the possible ways to share. Our other area for learning was the rubric and judging process. We will make some modifications to the rubric for this year's competition that will better reflect the process and important components of the final project. We will provide in-depth training for judges prior to the competition.

WHAT HAS BEEN THE RESPONSE OF YOUR STUDENTS/COMMUNITY?

A A sense of excitement and accomplishment in finding and creating solutions.

Students LOVE littleBits! It was standing room only throughout the competition day as parents, teachers and community members gathered to support the teams.

HOW WOULD YOU SUMMARIZE WHAT YOU'VE LEARNED IN IMPLEMENTING YOUR LITTLEBITS PROGRAM/CLASS?

We learned that our students have great capacity to learn and create in areas of STEM. littleBits allowed our students to synthesize their knowledge while creating remarkable projects and learn every step of the way.

DO YOU HAVE SUPPORTING DOCUMENTS TO SHARE?

Yes.
2013-14 School Based Competition Guidelines
2014-15 School Based Competition Guidelines
Placemat

A Trophies and awards are displayed to inspire students to work together as a team and put forth their best creative solution.

DO YOU HAVE PHOTOS OR VIDEOS THAT YOU CAN SHARE?

We have photos and videos from the day to share which can be viewed in the links below.
Photos: http://www.collierschools.com/photos/5-10-14_iSTEMCompetition.htm
Video: http://www.collierschools.com/video/newspack/051414STEM.htm

A Students exploring their concepts and creating a prototype.

B Students are encouraged to draft ideas and concepts on paper as part of iterative design thinking.

WHAT STANDARDS DID YOU INCORPORATE INTO YOUR LESSONS/PROGRAMS?

Science Standards
Big Idea: Forms of Energy
SC.4.P.10.1 - Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.
SC.4.P.10.2 - Investigate and describe that energy has the ability to cause motion or create change.

Math Standards
Mathematical Practice 1: Make Sense of Problems and Persevere in Solving Them
Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They monitor and evaluate their progress and change course if necessary.

Mathematical Practice 6 – Attend to Precision
Mathematically proficient students communicate precisely to others.

A Final submission of competition solution is shared.

WHAT ARE YOUR FUTURE PLANS FOR LITTLEBITS USE?

Future plans include expanding the competition across all 4th grade classrooms in the district.