EXTENSION
College of Agriculture, Biotechnology & Natural Resources

Let's Discover STEM

IP-22-01

Let's Discover STEM: Five-Year Report 2017-2022 Nevada Sustainable Communities Project

Funded by USDA NIFA—Children, Youth and Families At Risk (CYFAR)

Young children are born scientists. They are naturally curious about the world around them—eager to explore, invent and solve problems. They are enthusiastic investigators, and as they explore their world, they are beginning to develop STEM (Science, Technology, Engineering and Math) knowledge and skills.

Unfortunately, by the time they reach fourth grade, many children are lacking key STEM knowledge and skills.[1] Hispanic children are particularly at risk for not developing strong STEM skills and aspirations. In 2015, only 12% of Nevada Hispanic fourth-graders rated at or above proficiency in both math and science, which may help explain why Hispanics are underrepresented in STEM professions.[2]

Fortunately, early exposure to STEM, whether at home or in school, supports children's overall academic growth, develops early critical thinking and reasoning skills, and enhances later interest in STEM studies and careers.[3] Providing opportunities for young children can help them gain basic STEM skills in:

- Observing what is happening, what they see, hear and feel
- Predicting what will happen if they try something or what will happen next
- Experimenting and investigating their predictions to see what really happens and why
- Interpreting and drawing conclusions, such as whether the results would be the same in another setting

Equally important, involving parents encourages them to take an active role in creating a positive and safe environment at home for exploration and discovery.[4,5] By creating a stimulating STEM-rich environment at home, young children will be better prepared as they enter and progress through school.

Program Description

Funded by a NIFA Children, Youth and Families at Risk grant, *Let's Discover STEM/Descubramos STEM* was designed to provide enriching STEM experiences for young Hispanic children (3-6 years old) who likely would not have such experience, and to teach parents how to nurture children's curiosity by encouraging and supporting their children's early STEM learning.

Young children learn best when doing—touching, moving, testing, playing. Therefore, central to *Let's Discover STEM/Descubramos STEM* were workshops where children and parents were actively engaged in hands-on, developmentally appropriate activities designed to enhance STEM-related interest, knowledge and skills.

Targeting families in at-risk neighborhoods in Las Vegas and Reno/Sparks, the seven-week workshop series focused on beginning STEM, as well as parents' skills and confidence in boosting children's early STEM learning. The majority of these children were not in formal early childhood programs. During the weekly lessons, families:

- discussed key foundational STEM skills,
- engaged in a variety of hands-on, experiential STEM activities,
- read a carefully selected STEM book,
- learned about do-at-home enrichment activities that enhance the value of STEM, and
- received a free book and materials to complete additional enrichment activities at home.

Project Outcomes and Impact

Between 2017 and 2022, we taught 41 in-person and 13 virtual workshop series (378 individual parent-child workshops) at 36 community sites. We reached 1,055 families, 74% of which were Hispanic/Latino. Families were engaged in an average of 12 hours of directed STEM learning for a total of 12,660 hours across all families over the five-year period.

Parents responded to a variety of evaluation forms before, during and after the workshops. Assessment of impacts addressed four goals.

Goal 1. Children increase time engaged in STEM activities

A main goal of the program was to increase the opportunity for children to engage in enriching STEM activities. During the workshops, children participated in as many as 28 STEM-enriching activities. Also, each week we sent home ideas and activities for doing additional STEM activities. Over the course of the program, families did an average of 19 of the 24 suggested take-home activities. Nearly 87% of parents reported spending at least 30 minutes or more per week doing those activities at home, with 45% reporting spending one or more hours a week doing the activities. Through both in-class and at-home activities, children engaged in up to 52 STEM activities that otherwise would not have been done with these targeted children. In essence, through participating in the program, children and parents were engaged in enriching fundamental STEM activities that build STEM readiness and success.

Up to **2 hours per week** doing STEM activities

Goal 2. Children increase knowledge and interest in STEM activities

A second goal of the program was to improve children's knowledge and interest in STEM activities. At the end of the series, parents reported that their children increased their knowledge about STEM and their interest in doing STEM-related activities. Parents also reported that the program increased their own knowledge of STEM and their interest in doing STEM-related activities with their children. In other words, both children and parents increased their knowledge and interest in STEM because of the program.

Children

- Knowledge about STEM
- Interest in STEM-related activities

Parents

- Knowledge about STEM
- Interest in STEM related activities

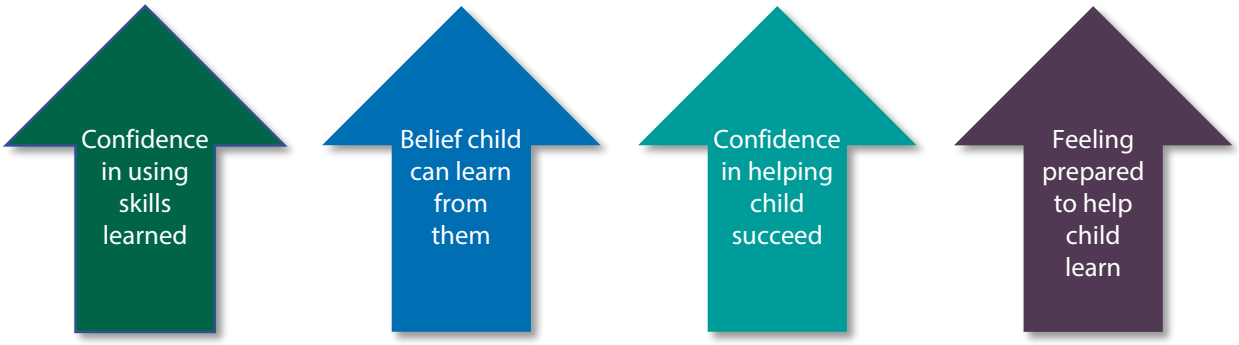
Goal 3. Children increase their STEM skills

Foundational STEM skills for young children include abilities such as counting 1-20; recognizing shapes; comparing objects to determine more or less; measuring length, size and weight; and building towers and bridges. Learning these skills early can set children up for success in STEM-related subjects in school. At the end of the series, parents rated their child's ability on 16 fundamental STEM skills. According to parents, children made significant gains on all of the emerging STEM skills focused on in the classes. In other words, parents saw an increase in their children's emerging STEM skills across the program.

22% increase in STEM skills

Goal 4. Parents increase their confidence

An additional focus of the project was to enhance parents' attitudes and confidence in their ability to help their children develop fundamental STEM skills. Children gain positive attitudes toward STEM when their parents have supportive beliefs about the importance of early STEM development and their role in helping that development. By the end of the program, parents reported being significantly more confident they could help their children gain STEM skills, that their children could learn from them, that they could help their children succeed in school, and that they were prepared to help their children learn. Parents also felt that the program helped strengthen their relationships with their children.



An Unexpected Challenge

The program began with in-person workshops, but had to pivot to virtual workshops during the COVID-19 pandemic. There were no significant differences in children's STEM readiness skills, or in reported gains in children's and parents' knowledge and interest in STEM, between in-person and virtual sessions. However, we did find that the virtual sessions had more consistent attendance and that families were more likely to do the take-home activities than those who attended the in-person sessions. Additionally, in-person parents reported more confidence in being able to help their children develop STEM skills.

Parent Comments

At the end of the workshops, we asked parents about their impressions of the program. We examined their comments and identified several themes. Parents mentioned numerous things they and their children learned during the program:

- **How easy it is to integrate STEM daily**. Parents appreciated that we showed them new ways to relate simple things to STEM and that doing STEM activities with children is simple and easy.
- **Children can learn while having fun**. They can learn and play at the same time and have fun.
- **STEM is everywhere**. STEM activities can be low cost using things around the home, and everything children do is learning. One parent mentioned that "there are thousands of ways to teach my daughter," while another said, "it is never too early to help them start learning STEM."
- **Children can act like scientists**. Parents commented that it is okay to let child explore and figure out their own ways to solve problems and figure out solutions.
- **Parents were amazed** that their children were able to do STEM activities; they had abilities parents were not aware of. One parent related that "I saw that my child has grown and learned much."
- **Parents believe that their children are better prepared to go to school**. Parents also mentioned that they gained knowledge on how to motivate children and to help them succeed in school.

- **Parents felt more confident that they can teach their children**. One parent expressed that "I can see what I'm already doing and am good at to help them." Another said that "Helping child learn STEM is easier than I thought."
- **Parents appreciated learning how to interact with their children** to support their learning. Parents learned how to be patient and learn from their children, and that they don't have to know all the answers.
- **Parents learned things they didn't know about STEM**. One parent stated that STEM activities are "super interesting."

Parents also commented on what they liked best about the program. Feedback centered on:

- **The design of the workshops.** Parents liked that the workshops were hands on and interactive, and kept kids engaged. They were pleased to see how much fun their kids had learning new ways to do things. They also appreciated that the workshops were in their primary language (Spanish) and were convenient for them.
- **Activities and materials.** Parents were pleased that the activities were simple and could be done with things they could find at home. They liked that the activities were based on children's age (i.e., developmentally appropriate) and that the books and materials were free.

- **Opportunity for interaction.** Parents appreciated the opportunity for interaction throughout the workshops. They mentioned the opportunity for children to interact with other children, parents to interact with other parents, and for parents to interact and spend more time with their children. They liked that they were encouraged to learn together with their children. One parent also mentioned that the program "united us as a family" and doing the home activities "became a family event."
- **Children's excitement for STEM.** Several parents commented on how thrilled they were to see how much their children enjoyed the program, noting they liked "Seeing how excited my child gets when completing the tasks together," "How engaged my son is to learn new things in a fun manner," and "Seeing how my son lights up! He would rather be here than watching movies and he loves the movies." Another parent commented "My daughter loved the class and never wanted to miss a class."

Program Expansion and Sustainability

Several steps were taken to ensure sustainability and expansion of *Let's Discover STEM/Descubramos STEM*. First, we created and published a program curriculum https://extension.unr.edu/parenting/program.aspx?ID=124 and registered it in the National Registry of Cooperative Extension Programs and Assets depository. Also, many of our community partners are able to continue supporting the workshops with their families, and we are taking steps to more closely integrate the program into our other 4-H programming. Finally, we continue to explore a train-the-trainer component to further expand the program throughout the state.



References

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Let's Discover STEM/Descubramos STEM was funded by USDA, National Institute for Food and Agriculture, Children, Youth and Families at Risk grant 2017-41520-26874.