

IN INSTRUCTION

ENCOURAGING PARENTS OF ENGLISH LEARNERS TO SUPPORT MATH AND SCIENCE LEARNING

Parents of all linguistic and cultural backgrounds share a common concern for the K-12 education and college- and career-readiness of their children. Findings from research support the positive effect that parental involvement can have on students' grades, on the achievement of low-income and minority students, and on school attendance and drop-out rates (Jeynes, 2011). Involving the parents of EL students in STEM fields can be challenging, as the complex language of these fields may pose difficulties for students and parents alike. Parents need to be able to help their children make meaningful connections to the math and science curricula of the school, and schools need to examine approaches to parental involvement that are linguistically appropriate and culturally relevant (Arias & Morillo-Campbell, 2008). Schools can help make connections to home realities as they integrate family funds of knowledge (see Gonzales, Moll, & Amanti, 2004) of math and science concepts, and link that knowledge to math and science in the classroom.



Educators also need to assist EL parents in understanding that math and science are key to college and career readiness. EL families and children should be encouraged to have math and science discussions of complex topics and conceptually rich ideas in their home language. Schools can provide supportive activities to assist EL parents with math discussion and science inquiry to create opportunities for exploration of career options in these disciplines.

Talking about Math and Science at Home

Researchers have offered a variety of methods to foster discussions of math and science in the home and for strategies to share with parents (e.g., Seymour & Hewitt, 1997; Faltis & Coulter, 2008; Nelson-Barber & Lipka, 2008).

- Play science, math, or technical problem-solving games with your child.
- Include your child in the technical aspects of domestic tasks as well as your own work.
- Talk about the role of math in activities specific to your culture. Nelson-Barber and Lipka (2008) share lessons based on the mathematical aspects of traditional Native fishing practices in Alaska.

Schools can help make connections to home realities as they integrate family funds of knowledge of math and science concepts and link that knowledge to math and science lessons. For instance, the home tasks of weighing and measuring for a recipe or making calculations and measurements for a home repair project can build student mathematics ability at home and be brought into classroom discussions.

Encourage schools to help parents understand how high school math and science instruction leads to preparation for college. Parents need to know that algebra and biology are essential courses for higher-level math and science. Algebra I, for example, is a prerequisite course that serves as a gatekeeper for such college preparatory subjects as Algebra II, Geometry, and

Trigonometry. Taking Algebra I by the ninth grade allows students the time and conceptual foundation necessary for college and career success.

Bringing Resources to Families:

Resources

Family Science Night Handbook – <http://www.sandia.gov/ciim/ASK/fsn.html>

Family Science Night Activities in Spanish:

<http://www.sandia.gov/ciim/ASK/downloads/FSN%20Spanish.pdf>

Science Activities to Try At Home (English & Spanish):

<http://www.sandia.gov/ciim/ASK/downloads/fsn-homeactivities.pdf>

Family Math and Mathematica Para Familia

<http://www.lawrencehalloffscience.org/equals/aboutfm.html>

Family Science Night

Sandia National Laboratories developed its family science night programs in response to research findings that showed that children perform at higher academic levels when their parents are also involved in the learning process. The appeal of these family science programs is that they provide hands-on opportunities for families to engage in an array of science activities and even to win prizes. While the program was initially designed to begin at the elementary school level, it has expanded to include elements of support in middle and high schools such as mentoring and science fairs, in addition to the development of materials in both Spanish and English.

Family Math

Family math engages adults and children in creative activities to support math learning for all family members. Activities address different aspects of math including solving word problems, logical reasoning, measurement, numbers and operations, probability and statistics, geometry, spatial thinking, calculations and micro computing. Activities utilize everyday objects such as beans, strings, and pennies.

Planning and Conducting a Family Math or Science Event

The overall emphasis of any family event is on having a great learning experience, and involving the parents of EL students in supporting their math and science understanding in a variety of ways. To make the event accessible, preview math and science activities with children, and encourage students to talk about the format of the event at home with their parents. Send a description of the event home in the students' native languages, and invite parents to assist in a variety of ways including suggesting activities, photocopying, set up or clean up. The event itself should engage families in math or science games and activities that connect parents with the activities and themes students are currently learning in their math and science classrooms. For example, teachers could draw connections between a simple, hands-on experiment of adding hydrogen peroxide to a balloon full of baking soda with the class' unit of study on chemical reactions and gas expansion.

Supporting Family Reflection and Discussion of Math and Science

Teachers can provide strategies and examples to parents for entry points into family discussions that deepen their understanding of opportunities in math and science fields. One strategy that can be adapted is a process of parent journals in response to a set of prompts (Chrispeel, Bolívar, & Vaca, 2008), which should be translated into parents' home languages. The process encourages parents to reflect, discuss, and plan for college and career readiness. Prompts may ask parents to consider their child's interests, goals, and aptitudes related to math and science; and how they are supporting them in achieving success in one of these areas. Examples of specific prompts include: What is your son's/daughter's perception of college? What is your role as parent in your son/daughter getting into college? My son's/daughter's interests are...My son's/daughter's academic goals are...

Supporting family involvement in students' math and science learning can be challenging. Educators can foster family involvement by pointing out home activities with a math or science component to parents, by ensuring parents are aware of the importance of math and science for college preparation, by hosting a family math or science event, and by helping parents reflect on the mathematics and science education of their children.

References

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