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Improving Math, Science, and Technology

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Improving Math, Science, and Technology Skills Among Selected Nebraska Native American Children

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Some Foundational Facts

- Motivation for at-risk elementary school children is not new
- Focusing on children in Native American reservation schools is unique
- The NASA Nebraska Space Grant (NNSG) began outreach over 4 ½ years ago
- The administration, faculty, and staff of the 4 Nebraska reservations schools and the two tribal colleges have been the target
- The concept used is called Family Aeronautical Science (FAS)

Three Underlying Principles

- Infrastructure Building
- We must know and trust each other
- Motivation of Students
- Students need to view science and math as fun things to do
- Curriculum Enhancement
- Integrate as much NASA science into the curriculum as possible

The Family Science Concept

- Study basic aeronautics during the regular school day
- Children and their parents attend evenings school functions
- Enjoy joint activities based on aeronautics
- A demonstration project occurred during the 2000-2001 school year at the Santee Community School on the Santee Sioux Reservation

Background

- Many reservation populations are plagued by un-employment
- In many cases, family conditions are poor
- School age children often have difficulty in meeting minimum academic standards
- Few students graduate from high school
- A smaller number attend higher education
- Many have limited skills in mathematics and science

First Demonstration in Santee

- Located on the northern border of NE
- Tribe numbers about 800 members
- School of about 200 students from K –12
- Location is isolated from distractions
- Administration and staff is most supportive
- NICC is located across the street
- Schools has gotten previous NNSG grants

A Key Piece of the Puzzle

- In 1999, one teacher from each reservation school went to NASA Ames
- The schools were Omaha Nation, Santee, Walthill, and Winnebago
- At the RURAL Workshop, teachers learned a multitude of aeronautical and aerospace skills
- We were able to send four more teachers summer of 2001

Basic Family Science Tenants

- Focused on grades 4 to 6 (but included family members in higher or lower grades)
- Integrated aeronautics into science periods
- Used the school computer lab heavily
- Scheduled 4 Family Fun Nights for academic year
- Planned for an evening meal each session
- Prayed heavily that the concept would work

Demonstration Dates and Activities

- October 2000: Forty-seven attendees, weather was clear, played airplane games
- November 2000: One hundred forty attendees, weather clear, CAPOW Wagon
- February 2001: Heavy snow, event cancelled
- April 2001: Forty-five attendees, taught parents to fly simulator, weather clear
- Attendance at other schools currently involved has been overwhelming

Participants' Comments

- "I'm into that flying now." Sonny, 8th grade
- "Not enough lift, you stall." Jeff, 6th grade
- "I have seen my child's grade go from D's & F's to B's and C's" (the same student is now on the honor roll)
- "My kids have been to school in Sioux City, and they don't have anything like this for the kids."
- "That's all my boy wants to do is go to the computer lab."

Second Year Activities

- Continued Santee program except moved focus to grades 1 to 4
- Started new programs at Winnebago and Walthill modeled after the Santee demonstration
- Paid a small stipend to the team leader at each school

- Allowed each school some latitude as to the exact integration of the aeronautics into the curriculum

Aeronautics Day is a Key

- Begun in the Fall of 1997
- Hosted by the 185th Fighter Wing, JetSun, and Sioux Gateway Airport
- Close to 1,000 Nebraska Native American youngsters have attended
- The message is stay in school, do well, study math and science, no drugs or alcohol, and there will be a future for you in aeronautics

Activities

- Day begins with assembly at the 185th Auditorium
- A bit of patriotism
- Pilot briefing
- Tours of the 185th and JetSun
- Groups rotate to both locations
- Lunch together
- Door prizes (everyone gets something)

Conclusions

- A great deal of headway has been made
- We are moving more slowly than many would wish
- We have built from the bottom up
- Such an approach is slower but more solid when completed
- NASA research in science and mathematics is slowly finding its way into classroom
- Students that are experiencing an aeronautics-based approach to mathematics and science seem eager for more
- A marked improvement in grades and achievement has been found in several Santee students
- A great deal of positive feedback is coming from parents and teachers alike
- More summative evaluation is planned for future activities
- It has become clear that more integration is needed in the math and science preparation streams between reservation school and tribal college
- We believe we are on the right track!

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