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Idaho Math Initiative

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Idaho Math Initiative

BACKGROUND

Why is the Idaho Math Initiative needed? As educators, we consistently hear from employers and colleges and universities in Idaho that Idaho students do not have the math skills they need to succeed in the work force or a postsecondary education setting when they graduate from high school. The preparation of teachers to impart high-level mathematics skills at the middle and high school levels has been gaining attention as U.S. business leaders and policymakers express worries about the ability of schools to train a globally competitive workforce. (Education Week, Dec. 07) The topic has also been a concern of the federal National Mathematics Advisory Panel, which highlighted in its preliminary recommendations released last month the need for "systematically improving teacher-preparation programs, as well as professional-development strategies for teachers already in the field." (Education Week, Dec. 07)

On the 2003 Program of International Student Achievement Exam (PISA), the U.S. ranked 28th and Canada ranked 6th. What's going right for Canada? They use problem solving based math programs with an emphasis on professional development. Conceptual Understanding is also emphasized. What's going wrong for the U.S.? The focus is on procedural knowledge and computation without a conceptual understanding. Our students are given fewer opportunities for problem solving, and there is less emphasis on professional development. Canada's standards emphasize student's communicating their thinking, investigating rich problems and making generalizations. The U.S., traditionally, has more of an emphasis on using symbols, memorizing, procedures and quick thinking.

The scores on the Spring ISAT also show a troubling trend in math as students move through our K-12 system: As students grow older, fewer of them reach proficiency on the ISAT. On the 2004-2005 Spring ISAT, for example, about 82.1 percent of 3rd grade students score proficient or above in math. But when those students were in 5th grade just two years later, only 73 percent scored proficient or above on the Spring ISAT. After 5th grade, student scores remain consistently below the 80 percent proficiency rate through high school. *(See Appendix A.)*

We must have a mentality that all students can be successful at mathematics. It is our job as educators to make sure that happens. Students must be introduced to informal strategies before being expected to perform at more formal levels of thinking. The understanding comes by using more concrete methods. When the conceptual understanding is solid then the formal strategies can be introduced. Educators must maintain this balance between conceptual and procedural understanding in order for all students to be successful. "We have to help (teacher-candidates) understand the kinds of students they are going to be working with and the kinds of strategies they're going to need to help them be successful. It's clear that math content has to be coupled with courses in pedagogy and understanding the content in a teaching context." (Education Week, Dec. 07)

Phase I of the Idaho Math Initiative: The Legislature appropriated $350,000 in seed money to fund Phase I of the Math Initiative, the research and development phase. From July 2007 to June 2008, the Math Initiative working group – made up of teachers, school administrators, school

board trustees, parents, math education experts and representatives from the business community – met from July 2007 to July 2008 to develop the implementation of the Idaho Math Initiative.

OVERVIEW

The Math Initiative working group used the $350,000 allocation in the FY2008 Public Schools Budget request to develop the details of the Idaho Math Initiative. In the FY2009 Public Schools Budget request, Superintendent of Public Instruction Tom Luna is asking the Legislature for $3.9 million for the implementation of the Idaho Math Initiative, which will help raise student achievement in mathematics across all K-12 grades. The Idaho Math Initiative will focus on three main areas: teacher education, student achievement and public awareness.

IMPLEMENTATION OF THE IDAHO MATH INITIATIVE

The Idaho Math Initiative will begin in the 2008-2009 school year. The following is a detailed description of the initial phase of the Math Initiative.

Student Achievement

Assessment

- ***Grades K-2:*** Phase II will be a pilot year for a new assessment for students in grades K-2. The assessment will consist of number sense and algebraic thinking concepts for these students. Currently, no assessment for mathematics exists in these grades. ISAT testing begins in 3rd grade. It is important that teachers are using instructional techniques that support a balanced approach to include deep conceptual understanding of number in the early grades so students are successful in higher grades and develop a positive attitude about their ability to solve problems. An assessment in the early grades also allows us to identify students who need remediation so intervention can take place at an early age. A committee of teachers, along with the Northwest Regional Educational Laboratory based in Portland, will convene to develop the assessment in February 2008. The State Department of Education is using current math research, national assessment samples developed by the National Council of Teachers of Mathematics, professional expertise, and Idaho's state and national standards to develop this assessment. The assessment will be administered individually to students by the classroom teacher and will take approximately 10 minutes. Test items will be given orally with students having a test booklet to use for reference. The State Department of Education will continue to analyze data gathered to identify trends in student performance. With a successful pilot year in 2008-2009, a statewide implementation will take place the following school year.
- ***Grades 3-8*:** It is important to continue performance-based assessment where students are allowed to show the process they use to solve problems. By using open-ended responses and looking at students' thinking, teachers are able to pinpoint misconceptions and address these issues. This is not seen in a multiple choice assessment. In Phase II, we recommend continuing this open-ended assessment as currently being given in the Direct Math Assessment format with minor changes, or we recommend combining this approach with the Spring ISAT in grades 4, 6, and 8. A survey is being given to 2,000 educators in January 2008. Final decisions about an assessment in these grades will be made by the State

Board of Education's Assessment Review Committee, which the Math Initiative working group has worked closely with since July 2007. After the results of this survey are release, the Math Initiative working group will make its recommendation.

- ***Grades 9-12*:** The Math Initiative working group recommends grades 9-12 utilize end-of-course assessments. These assessments will be addressed in future phases of the Idaho Math Initiative.

Intervention

We recognize the trend in Spring ISAT scores in which math scores start dropping in the 5th grade and stay consistently below the 80 percent proficiency rate through high school. The Math Initiative working group has concluded there are two major reasons why the current intervention methods have not been as successful as hoped:

1. Teachers have not been trained in a methodology that can move these struggling students forward academically.
2. School districts do not have the capacity to require 40 additional instruction hours, as was required by the Idaho Reading Initiative.

The working group has researched intervention tools that will meet the needs of all students whether they are below grade level and need remediation or perform above grade level and need advanced opportunities. Here are some of the items we believe a successful intervention system must address:

- Intervention should be immediate
- Concepts should be taught in context
- Instruction should be differentiated, based on individual needs of students
- Intervention must motivate and engage students
- Students' misconceptions should be addressed
- Progress should be monitored on a regular basis

The implementation of the Idaho Math Initiative will begin a one-year pilot of a program that has these components. A statewide rollout is the recommendation. This will fit the need of middle school students in grades 5-8 and will meet the need of all students. The program would be available for students during the school day as well as before and after school. The Middle School Task Force and Rural Education Task Force both have supported these efforts as they see this program to be motivational for students and meeting the needs of rural students as well as students in more populated areas.

Standards

The high school standards for mathematics are currently undergoing revisions to meet the new math requirements for the class of 2013, which the Legislature approved during the 2007 session. The Idaho Math Initiative will include the rollout of these standards, which have a more conceptual approach. Students will be demonstrating their knowledge and applying what they've learned by meeting course specific-standards. Teachers will need support in using this updated document.

Curriculum

The Idaho Math Initiative includes focusing on the curriculum currently being used in our classrooms. This summer, a curriculum committee will meet to revised and update our list of

textbooks in the area of mathematics. Materials must meet the current K-8 standards and the revised high school standards. This year's committee will look for that balance of activities that support conceptual understanding, students applying their knowledge, problem solving tasks, computational fluency, and students communicating their thinking. The committee will develop a rubric to use in this process. There is no one silver bullet when choosing math materials for states to use; however, we want to ensure Idaho teachers have the best possible materials currently available.

Total cost estimate for student achievement: $2.3 million

Teacher Education

Core Class for Math Teachers

A three-credit core math class will be a focus of the first year of the Idaho Math Initiative. Math teachers and administrators who evaluate these teachers will be required to take this core math class for certification in the year 2015. The course will focus on how students successfully learn math. This course is to support teachers by educating them about the latest research, questioning strategies, ideas for using formative assessments, best practices for individualizing instruction, ways to deal with student's misconceptions, and opportunities for students to communicate their thinking processes. The working group is collaborating with universities and teachers to develop the content of this course.

To encourage teachers to complete this course as soon as possible, the state will pay for the credits of teachers who successfully meet the requirements of the class in the first year. This is similar to the protocol used in the Idaho Reading Initiative with the comprehensive literacy course.

Regional Teacher Workshops

In the first year of the Idaho Math Initiative, the Department will create regional teacher workshops. The format and content for the teacher workshops is in the development phase as the working group continues to look at these workshops with teachers. Many school districts and teachers have asked for more training in mathematics, and the state needs to support districts and meet their needs as we move forward with improving math instruction. In the first year, each region will have $20,000 to use for these workshops.

Outline Math Endorsements

In the coming year, the Math Initiative working group will continue to meet with our colleges and universities as well as the Department's Certification office to offer teachers the opportunity to earn a math endorsement in elementary or middle school math. Our goal is to create an outline of courses that would be required for this endorsement. Teachers would have the chance to add this endorsement to their standard K-8 teacher certificate. With this math endorsement, teachers could secure a role as a math specialist. There is a need for math specialists to work with teachers in classrooms in a "coaching" environment. These specialists can provide model lessons, standards and curriculum implementation, and support with intervention strategies.

Total cost estimate for teacher education: $1.5 million

Public Awareness

An important part of the Idaho Math Initiative is educating teachers, school administrators, parents, students and the general public about the Math Initiative's goals and the implementation process. This will include brochures and mailers, an up-to-date Web site and community activities, such as family math nights at the schools. The Math Initiative working group is still developing the full details of the public awareness piece.

Total cost estimate for public awareness: **$100,000**

Evaluation

The State Department of Education will evaluate the effectiveness of the Idaho Math Initiative after implementation. The Department wants the Idaho Math Initiative to effectively use taxpayer dollars to raise student achievement in math across all grades. Therefore, the Department will closely monitor student performance on the ISAT and other assessments used in K-12 to measure the success of the Idaho Math Initiative.

STATE FISCAL YEAR 2009 REQUEST

The State Department of Education is requesting $3.9 million in Fiscal Year 2009 to implement the first year of the Idaho Math Initiative, which will focus on student achievement, teacher education and public awareness.

APPENDIX A

Chart: ISAT scores in Math from 2004-05 to 2006-07

School Year	Grade Level	% of students proficient or above
2004-05	3	82.13
2005-06	3	91.39
2006-07	3	86.33
2004-05	4	90.02
2005-06	4	89.51
2006-07	4	81.93
2004-05	5	78.05
2005-06	5	87.88
2006-07	5	73.00
2004-05	6	71.21
2005-06	6	85.62
2006-07	6	74.76
2004-05	7	75.30
2005-06	7	75.81
2006-07	7	70.22
2004-05	8	69.23
2005-06	8	71.57
2006-07	8	71.87
2004-05	9	69.56
2005-06	9	71.06
2006-07	9	72.96