Year One Report on Evaluation of Elementary Mathematics Initiative: "Investigations in Number, Data, and Space"

School Board Meeting
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PWCS Math Vision Statement

Prince William County Schools' mathematics program promotes an environment in which students develop a comprehensive and enduring understanding of the concepts of mathematics. Students learn to effectively apply these concepts and use a variety of problem solving strategies. The program nurtures a productive disposition toward mathematics, challenges all learners, and supports further investigation in this field.

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History of the Program in PWCS

- Textbook Advisory Committee
  - Committee of administrators, teachers, and parents formed in April 2005
  - Materials judged using NCTM standards
  - Recommendations made to School Board in December 2005
- School Board adopted materials in January 2006
- Implementation Phased In Over Time
  - Grades K-2 started in 2006-07
  - Grade 3 started in 2007-08
  - Grade 4 will start in 2008-09

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Purpose and Objectives of Year One Report

Purpose

- To provide the School Board with important preliminary findings after the first year of the evaluation of the Mathematics “Investigations” program.

Objectives of the Evaluation

- Examine program outcomes.
- Examine implementation.
- Inform decision-making.
- Inform program improvement.

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Preliminary Findings: Year One

Baseline Student Outcomes

- Overall, more than 80% of second graders and about 70% of first graders are proficient in all math skills assessed on the 10 SDMT subtests.
- PWCS overall national percentile ranks and stanines on the SDMT were "average" for grades 1 and 2.

Professional Development and Quality of Instruction

- Multiple sessions offered for administrators and teachers during the course of school year 2006-07.
- Principals and teachers reported that teachers were prepared.
- Just over 20% of the teachers indicated need for more support with teaching skills.

Stakeholders' Perceptions

- Principals, teachers, and parents indicated positive outlooks on the math "Investigations" program.

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Professional Development

Principals

- 10 sessions offered on topics such as teaching mathematics, community engagement, and classroom observation.
- Based on surveys (N = 41), 88% of principals were “somewhat satisfied” (44%) or “very satisfied” (44%) with sessions and activities they attended.

Teachers

- 12 sessions offered on topics such as using “Investigations” in the classroom, structure of the program, and unit lessons
- Based on surveys (N = 722), 22% of teachers indicated need for more support with pedagogical skills.

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Quality of Mathematics Instruction

Principals' Perceptions

- "Teachers are prepared to teach with 'Investigations'."
- 88% of principals "agreed" (56%) or "strongly agreed" (32%).

Teachers' Perceptions

- "Teachers are skilled in math instruction."
- 95% of teachers agreed.
- 22% of teachers indicated a need for more support with pedagogical skills.

Parents' Perceptions

- "How satisfied are you with your child's math instruction?"
- 79% of parents were "very satisfied" (51%) or "somewhat satisfied" (28%) in 2006-07.

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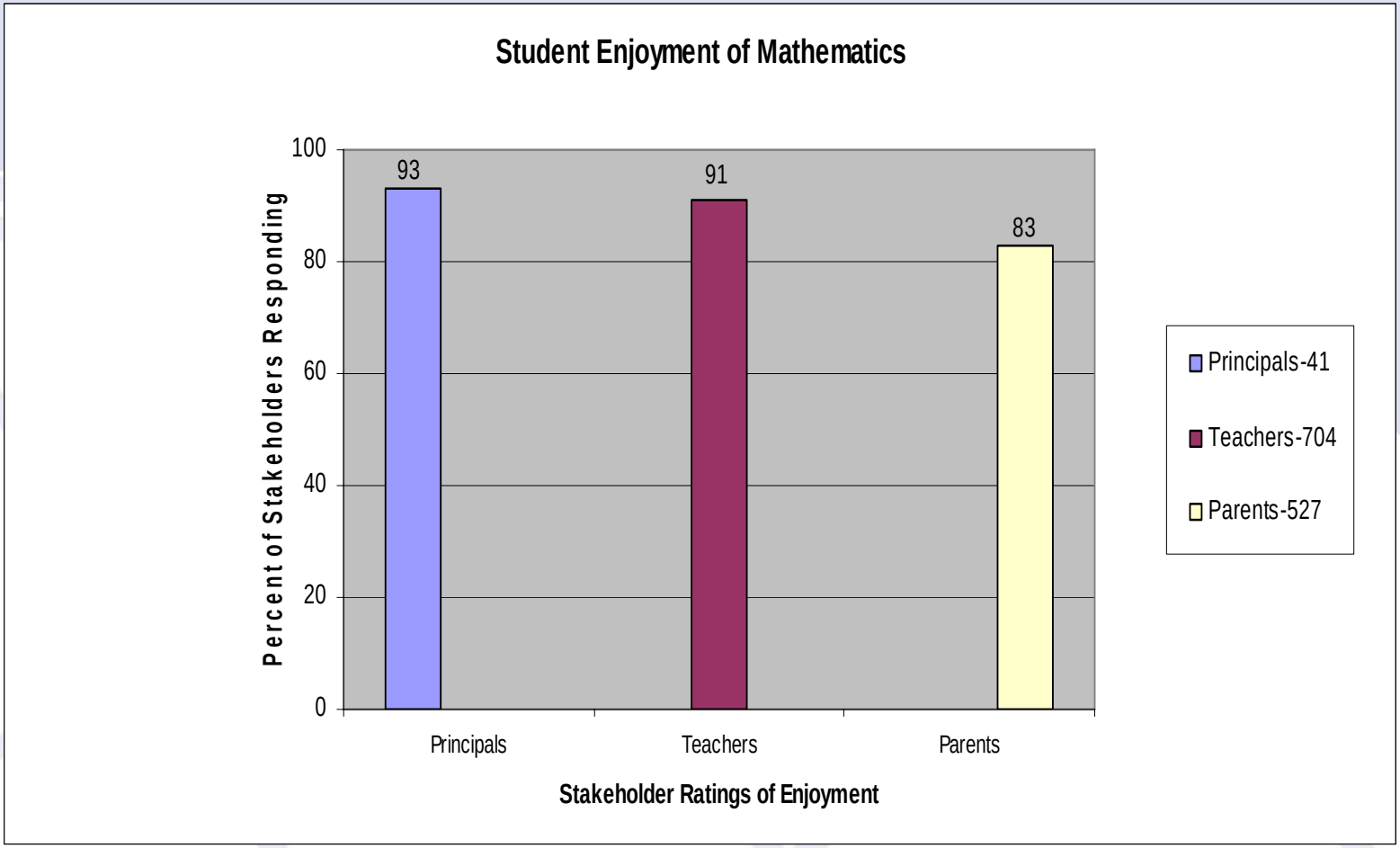
Student Enjoyment of Mathematics



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Baseline Student Achievement

Assessment Instrument

- Used Stanford Diagnostic Mathematics Test (SDMT) to assess computation skills and problem-solving strategies.
- All students in grades 1 and 2 participated.
- Needed consistent measure of student outcomes to evaluate the effectiveness of “Investigations” at a Division level (currently there is none for K-2).
- Assessment must be reliable and credible to stakeholders and critics

Score Interpretations

- Skill Mastery
- Comparative

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Baseline Student Achievement

Proficiency in Mathematics Skills Assessed by SDMT

Concepts/Applications (total items: 32)

- Number systems and numeration
- Patterns and functions
- Problem solving
- Graphs and tables
- Measurement
- Geometry

Computation (total items: 20)

- Addition facts
- Addition operations
- Subtraction facts
- Subtraction operations

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Division Performance on SDMT: Skill Mastery

Grade 1 Students

- Approximately 70% proficient in all 10 skill areas
- Over 80% proficient in 2 of 10 skill areas

Grade 2 Students

- Over 80% proficient in all 10 skill areas
- Over 90% proficient in 5 of 10 skill areas

Students in Both Grades

- Performed slightly better on ‘Concepts and Applications’ than on ‘Computation’

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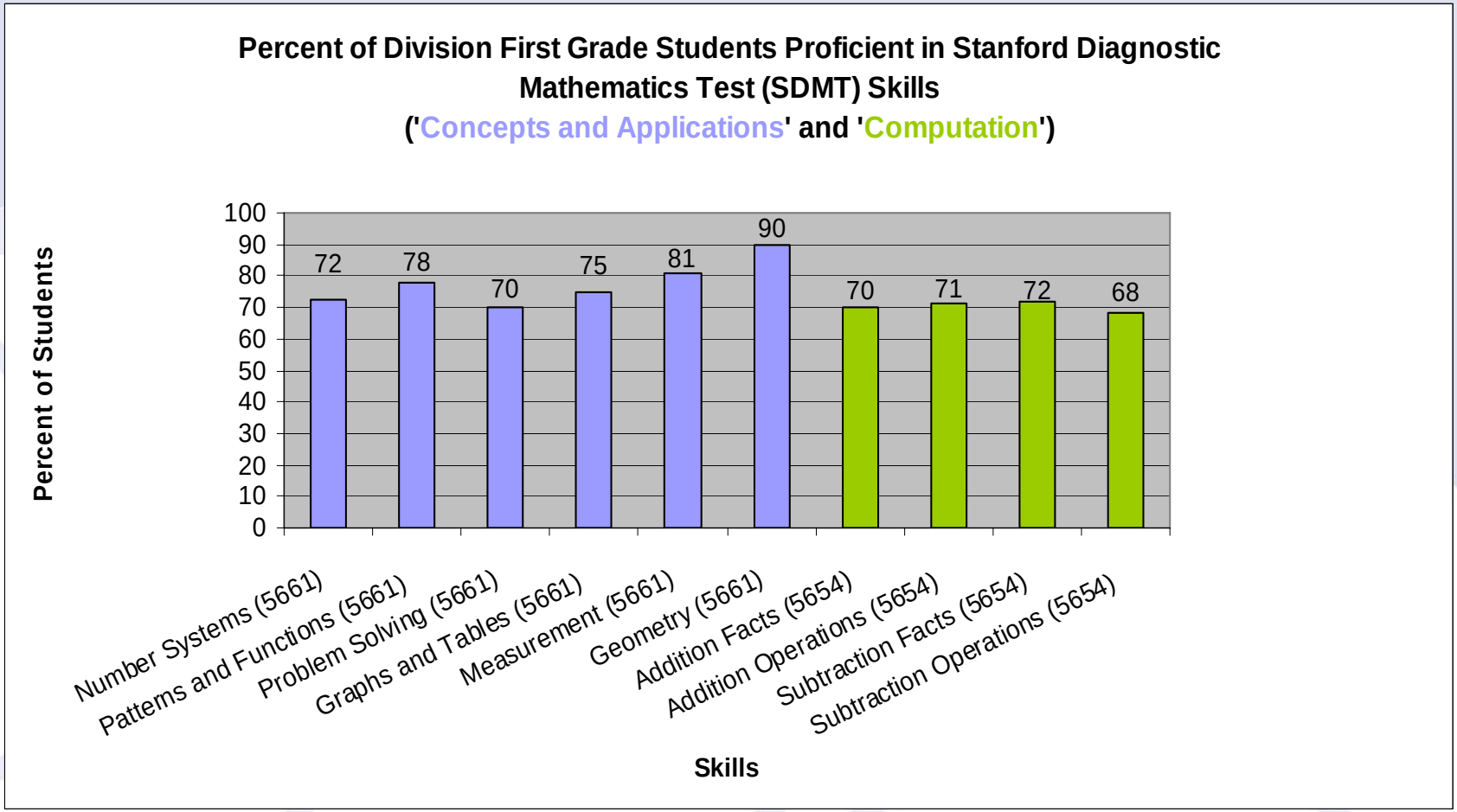
SDMT Performance – First Grade Students



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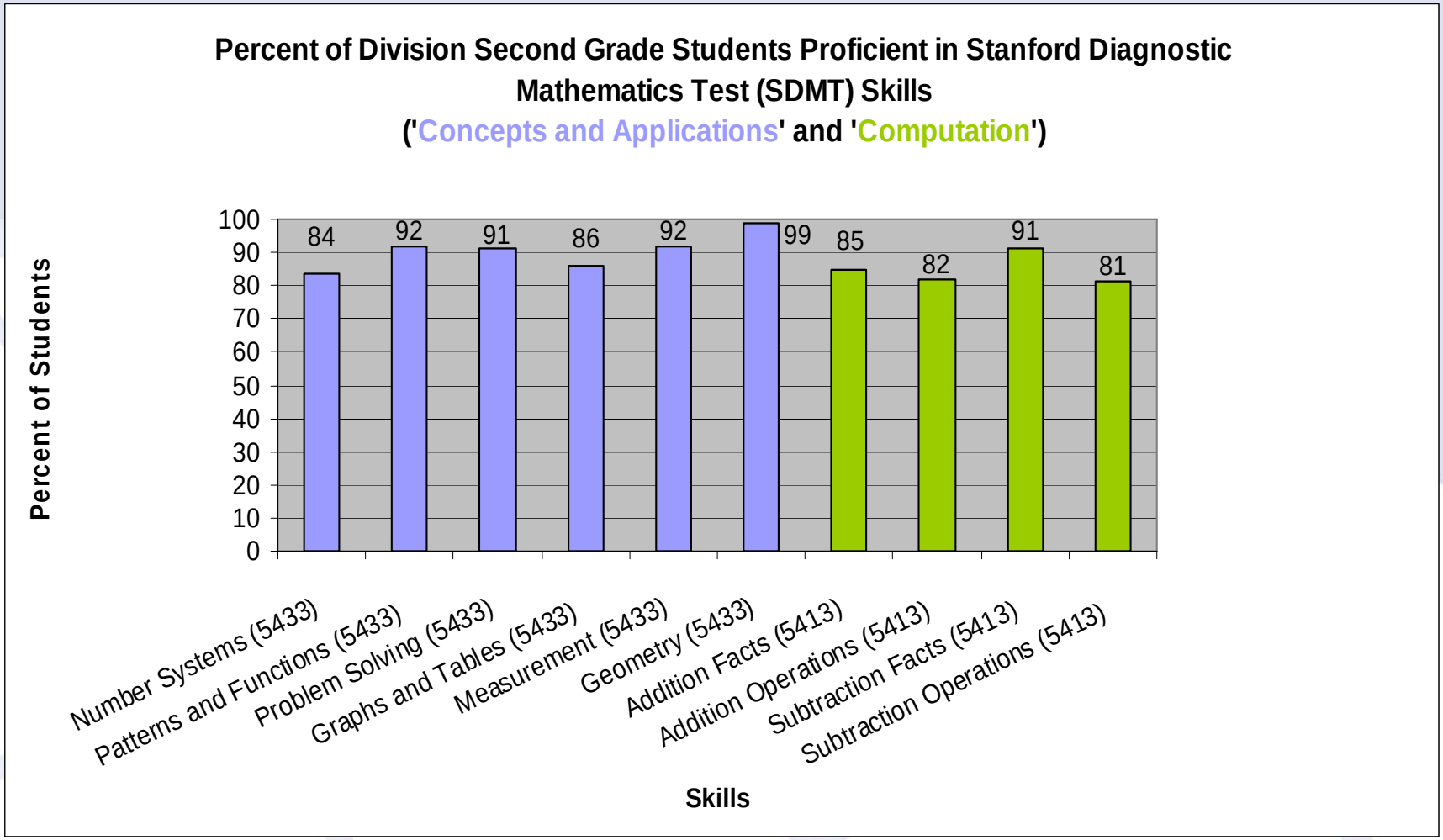
SDMT Performance – Second Grade Students



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Performance Gaps on the SDMT

Disadvantaged vs. Non-Disadvantaged Students

- Gaps existed between the percent of disadvantaged and non-disadvantaged students that were proficient on each of the 10 SDMT subtests for both first and second grade.

- Gap Range
  - 7.8 to 16.9 percentage points for first graders.
  - 0.4 to 13.8 percentage points for second graders.

- For both grades:
  - Largest gap was in “number systems and numeration”
  - Smallest gap was in “geometry”.

- Similar gaps were found on grade 3 SOL tests in spring 2007 (non-“Investigations” cohort)

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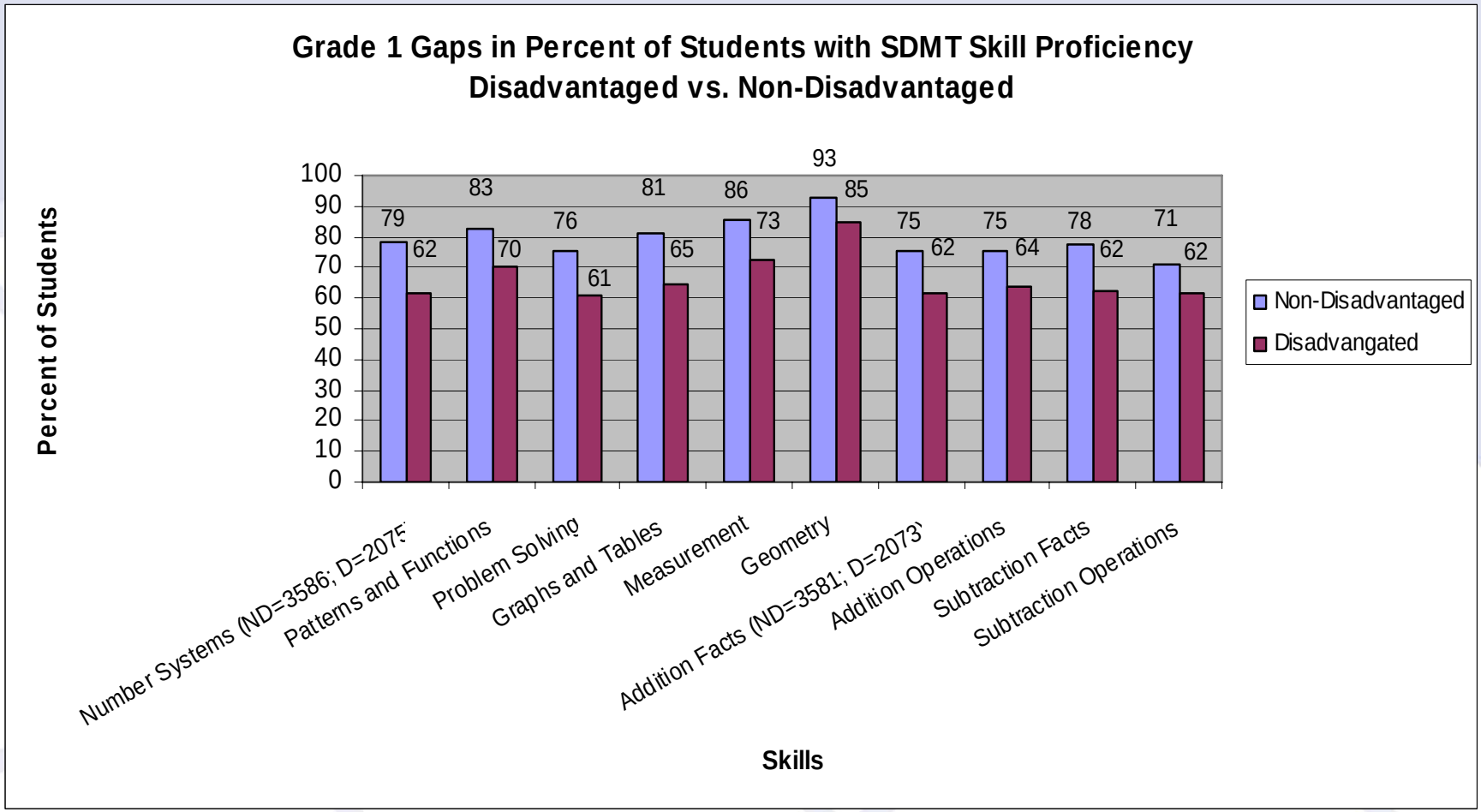
Grade 1 Performance Gaps



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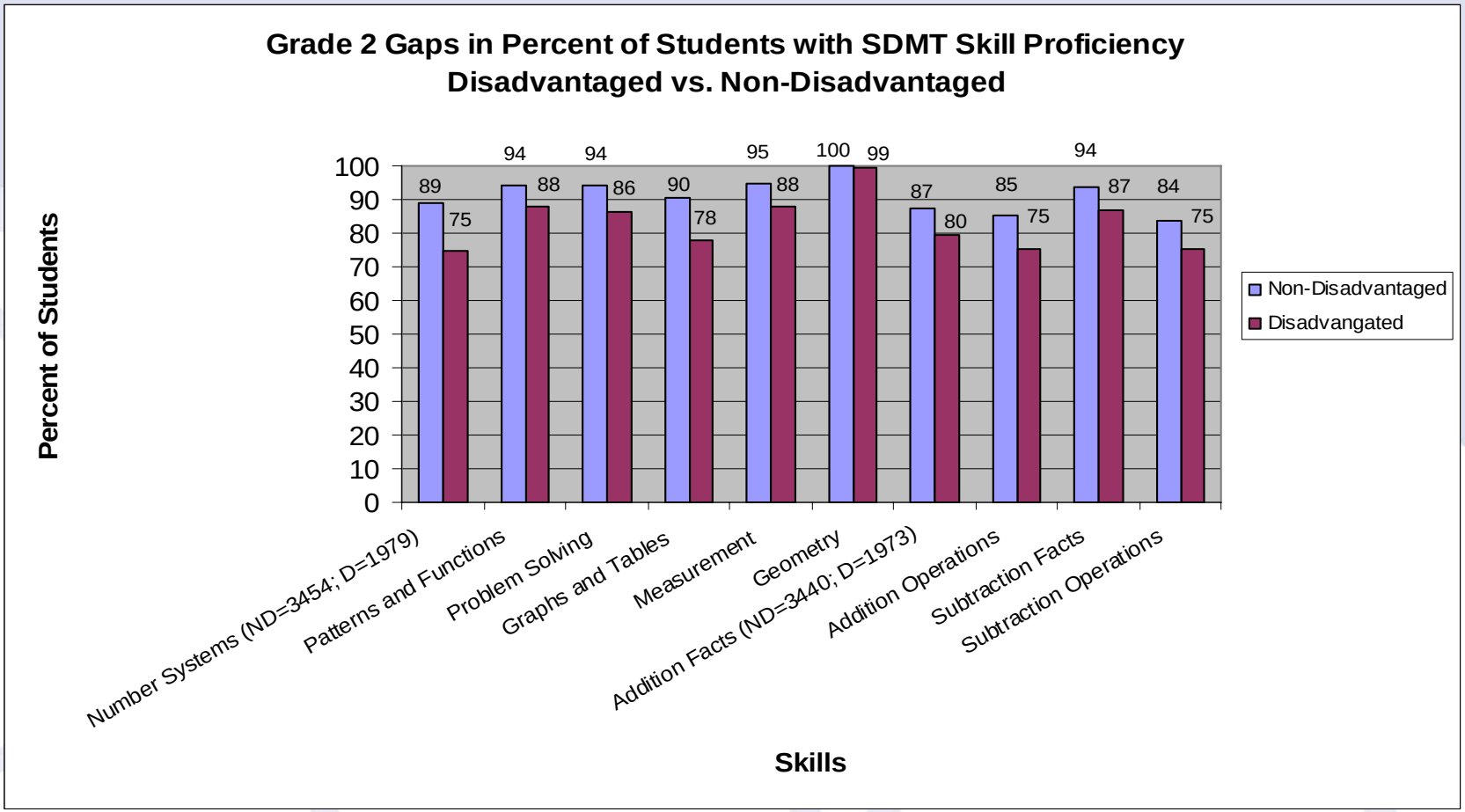
Grade 2 Performance Gaps



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Division Performance on SDMT: National Comparisons

National Percentile and Stanine Rankings of PWCS on the SDMT

Skill Category	Students Tested		Percentile Ranking		Stanine Ranking	
	Grade 1	Grade 2	Grade 1	Grade 2	Grade 1	Grade 2
Concepts and Applications	5661	5433	49	54	5	5
Computation	5654	5413	44	45	5	5
Total	5625	5396	45	50	5	5

50th Percentile = National Average

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Next Steps

- **Evaluation will continue to monitor program impact on student achievement**
  - Year Two Report (2007-08 data) will include SOL scores for first Grade 3 cohort to have experienced “Investigations”
  - Growth from Grade 1 to Grade 2 will be studied
- **Evaluation will monitor program implementation**
  - Evaluation advisory team is responsible for developing instruments for collecting implementation data
  - Observation instruments will be made available for schools to use as tools beginning in March 2008
- **Formative report to be provided to math office in January 2008**
  - Program implementation will be connected to program impact
  - Recommendations made for program improvement

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