Washington State LASER Leadership and Assistance for Science Education Reform

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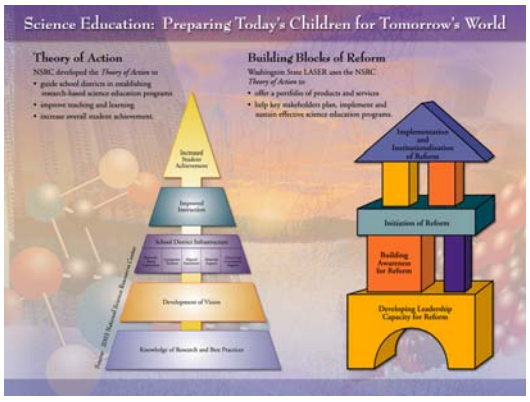
Washington State LASER

An Understandable Model from NSRC



-Theory of Action

-Building Blocks of Reform

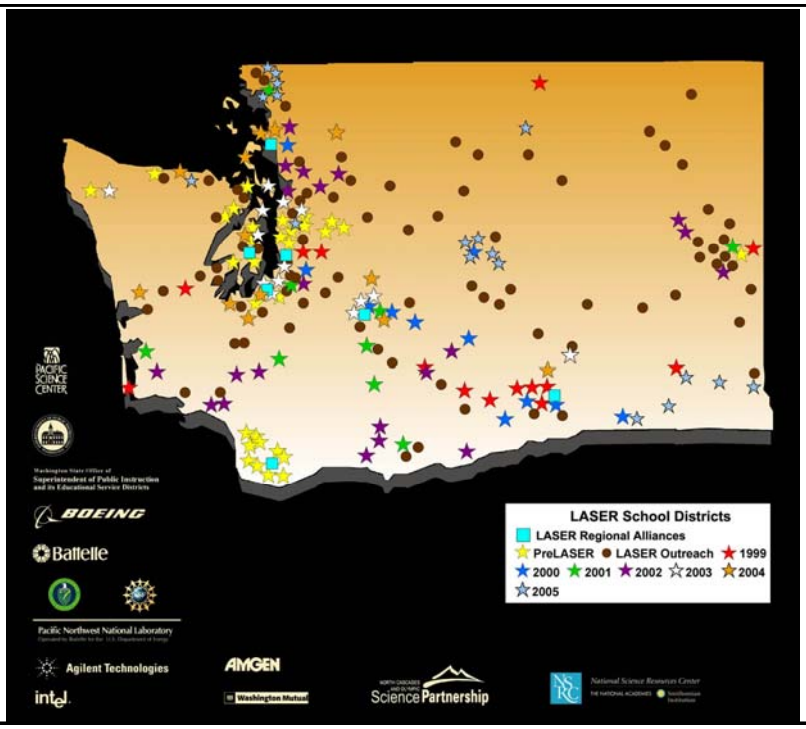
-Key Components Aligned with School Improvement

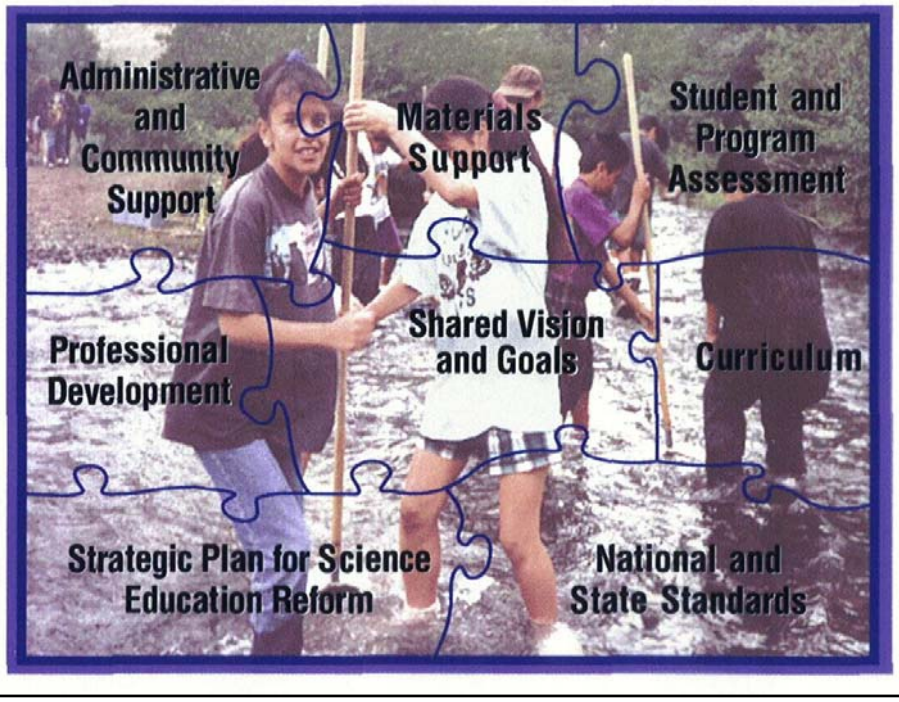
Washington State Science Standards

- Call for a new way of teaching and learning
- Reflect how science itself is done
- Emphasize inquiry as a way of achieving knowledge and understanding about the world
- Make acquiring scientific knowledge, understanding and abilities a central aspect of education

Overall Objective for *Washington State LASER*

To implement over ten years an inquiry-based Science Education program in all 296 Washington State school districts


LASER School Districts
LASER Regional Alliances
PreLASER
LASER Outreach
1999
2000
2001
2002
2003
2004
2005
Pacific Science Center
Washington State Office of Superintendent of Public Instruction and its Educational Service Districts
BOEING
Battelle
Pacific Northwest National Laboratory
Agilent Technologies
intel
AMGEN
Washington Mutual
Science Partnership
National Science Resources Center


Administrative and Community Support
Materials Support
Student and Program Assessment
Professional Development
Shared Vision and Goals
Curriculum
Strategic Plan for Science Education Reform
National and State Standards

1. Develop agreements with cooperating school districts
2. Obtain, house, maintain and distribute instructional materials
3. Provide high quality professional development
4. (based on 18 hrs/unit or 54 hrs/3 units)
5. Build teacher leaders to support regional, statewide science reform efforts
6. Work collaboratively with science education partners

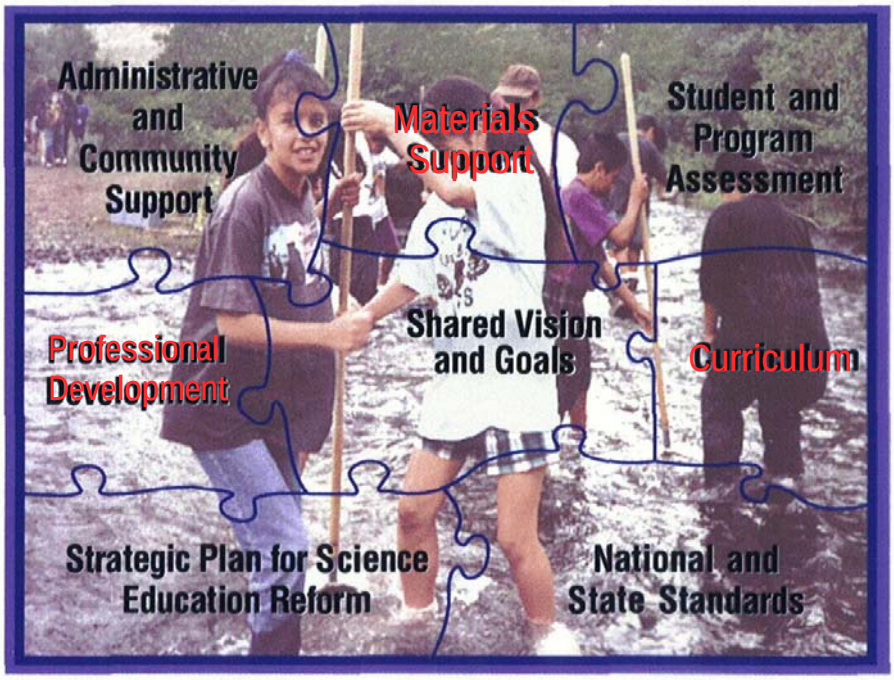
Washington State LASER Leadership and Assistance for Science Education Reform

South Central LASER Alliance

One of 10 Regional Alliances in WA State

Who We Are

- 22 School Districts and 2 Private Schools in partnership with ESD 105
- 1200 elementary teachers
- 30,000 elementary students
- Demographics:
  - 65% Poverty
  - 50% Hispanic
  - 60% of WA migrant students are located in our area



South Central LASER Alliance

Curriculum and Professional Development

	Physical Science	Earth Science	Life Science
K			LIFE CYCLE OF BUTTERFLIES
1	SOLIDS & LIQUIDS	WEATHER	COMPARING & MEASURING
2	BALANCING & WEIGHING	SOILS	ORGANISMS
3	CHEMICAL TESTS	ROCKS & MINERALS	PLANT GROWTH & DEVELOPMENT
4	ELECTRIC CIRCUITS	LAND & WATER	MICROWORLDS
5	FOOD CHEMISTRY	MOTION & DESIGN	ECOSYSTEMS
6	FLOATING & SINKING	MAGNETS & MOTORS	EXPERIMENTS WITH PLANTS

Professional Development

2-Day Initial Use Trainings

- 2-Days/12 hours on all modules
- Teachers immerse in all 16 lessons
- Teachers develop a model Science Notebook

Professional Development

- Teachers understand the Teachers Guide
- Teachers learn classroom management of materials and inquiry processes
- Teachers learn constructivist instructional practices

Professional Development

30 Master Trainers

- Drawn from the original Teacher Leaders group
- They are all classroom teachers except for 2 trainers
- Located in several of the Alliance districts
- **Trainers are key to sustaining the program!**

Professional Development

- 1-Day Content Workshops
  - Purpose: Deepen teachers knowledge of the science concepts underlying their module.
  - University Partners
  - Informal Science Partners

Professional Development

- Recommended training schedule for first time teacher:
  - Physical Science modules in year one
  - Earth Science/Technology modules in year two
  - Life Science module in year three
- Over 900 elementary teachers trained 05-06 in our Alliance.

South Central LASER Alliance

District Implementation Models & Materials Support

District Implementation Models

Model 1

All teachers are trained on all modules, teaching science all year

	Physical Science	Earth Science	Life Science
K			LIFE CYCLE OF BUTTERFLIES
1	SOLIDS & LIQUIDS	WEATHER	COMPARING & MEASURING
2	BALANCING & WEIGHING	SOILS	ORGANISMS
3	CHEMICAL TESTS	ROCKS & MINERALS	PLANT GROWTH & DEVELOPMENT
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District Implementation Models

Model 2

Paired grade level teachers: one teaches science to both classrooms

Model 3

One teacher teaches science to 3-4 grade level classrooms

Model 4

Science specialist for a pull-out program

Materials Support:

Science Resource Center

Materials Support:
Science Resource Center

South Central LASER Alliance
Lesson Learned

#1: Convincing leaders to make the decision to invest.

South Central LASER Alliance

Lesson Learned

#2: Organization and set-up of the project.

Resolving the Challenge

- The creation of the science cooperative
  - Science Cooperative Science Board
    - Executive Committee
    - Professional Development training
    - One-day Content training
    - Science Kit rotation

Washington State LASER Student Outcome Study Results

Our Hypothesis

Intensive professional development on the implementation of coherent, inquiry-based K-5 science instructional materials will have a positive impact on the student achievement in science

The Bottom Line . . .

- **Yes!** There is solid evidence to support this hypothesis
- Evidence was found in several separate analyses of existing data sets

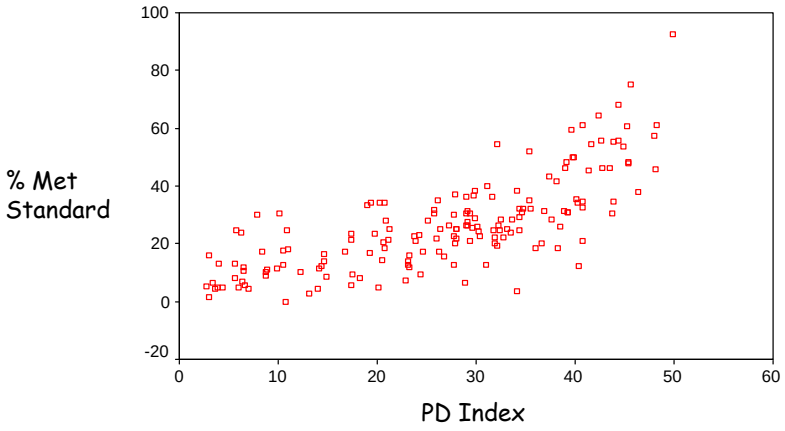
The 2004 WASL Study

WASL Study Data Sources

- School-level Grade 5 Science WASL Data for 2004
- School Demographic Data 2001-2004
- LASER Module Training Hours
- LASER Science Reform Rubrics data about the levels of implementation (2003)

WASL Study Analysis

- Looked for significant relationships between the:
  - Percent of students who met the Grade 5 science standard and
  - The amount of LASER professional development that the teachers received



Findings From WASL Study

- There is a significant positive relationship between LASER professional development and the percentage of Grade 5 students who met the science standard.
- This point cannot accurately be determined from the available data so we needed further data to see this relationship more clearly

The 2004 HRI Study

Horizon Research Incorporated

HRI Study Data Sources

- Pre- and post assessment (Tests) results from 42 Grade 6 classes (1000+ students)
- LASER Science Reform Rubrics data about the levels of implementation (2004)

HRI Study Analysis

Looked for significant relationships between:

- The level of implementation based on reform rubric data (HRI tests)

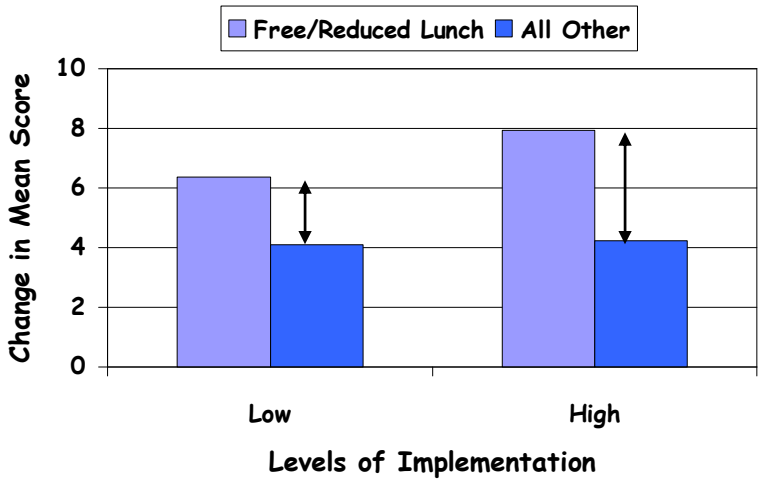
and

- Gains in student achievement

HRI Study Analysis Methods

- Comparison of means in student scores between various levels of implementation (number of modules)
- Controlling for the effects of the % of students who qualify for poverty level

Achievement Gains



More Questions

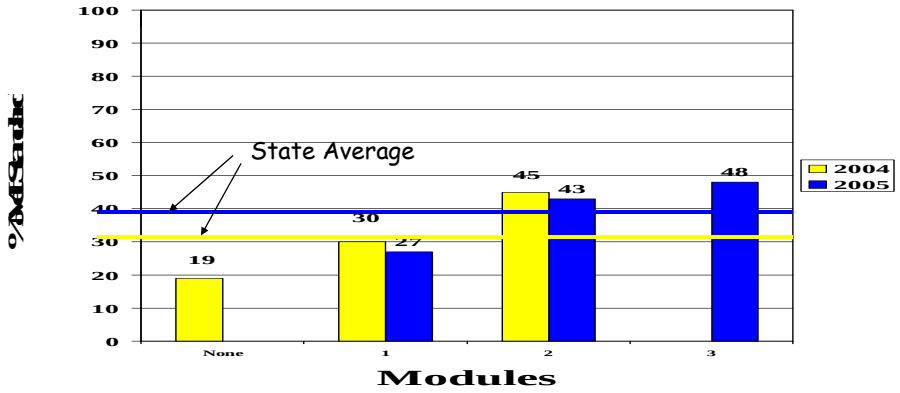
- Are there other factors that contribute to these findings besides the number of modules?
- If we control for these factors, will the relationship between number of modules and student achievement remain significant?

West Valley Study

Preliminary Observation

- West Valley School District study
  - Pilot test involving phased implementation of inquiry-based instructional materials
  - Noticed an important relationship between the number of modules students experienced and Grade 5 science WASL Scores.

Science WASL – WVSD Grade 5
% students meeting standard
Students receiving LASER Science instruction



Conclusion

The number of science modules that students experience has a significant positive impact on their science WASL achievement above and beyond what can be explained by demographic factors.

(FRL, Special Education, & %White)

Reason for Further Analysis

- Are there other factors that contribute to these findings besides the number of modules?
- If we control for these factors, will the relationship between number of modules and student achievement remain significant?

- Year 1:Teacher Leaders (one per grade level) PS unit
- Year 2: Remaining teachers PS unit; Leaders ES unit
- Year 3: Teachers ES unit; Leaders LS unit
- Year 4: Teachers LS units

Contact Information

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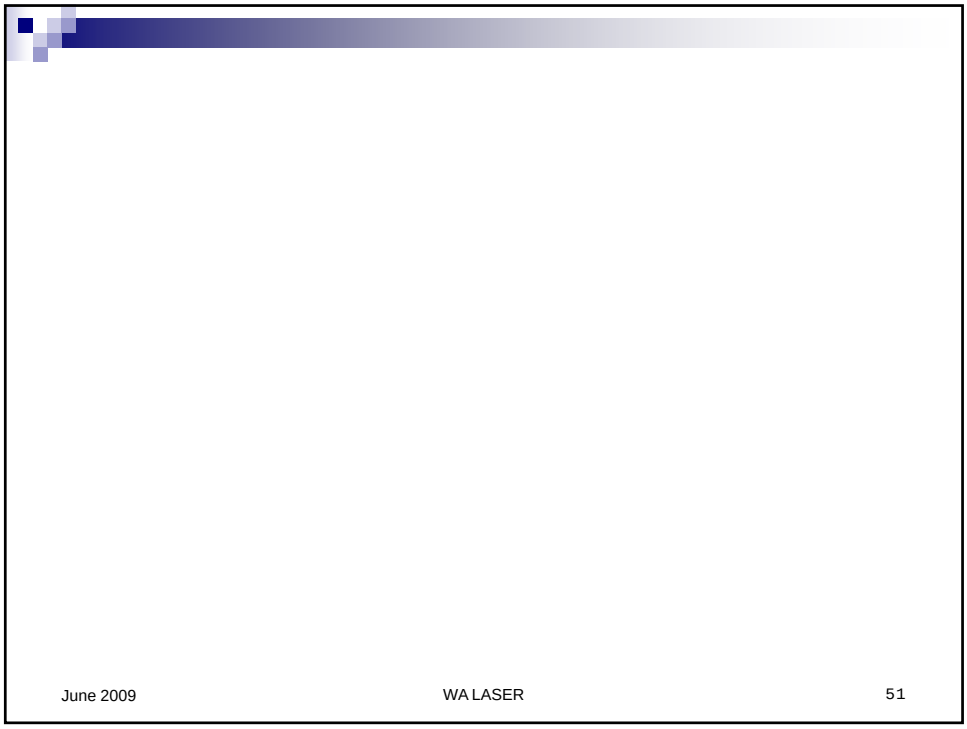
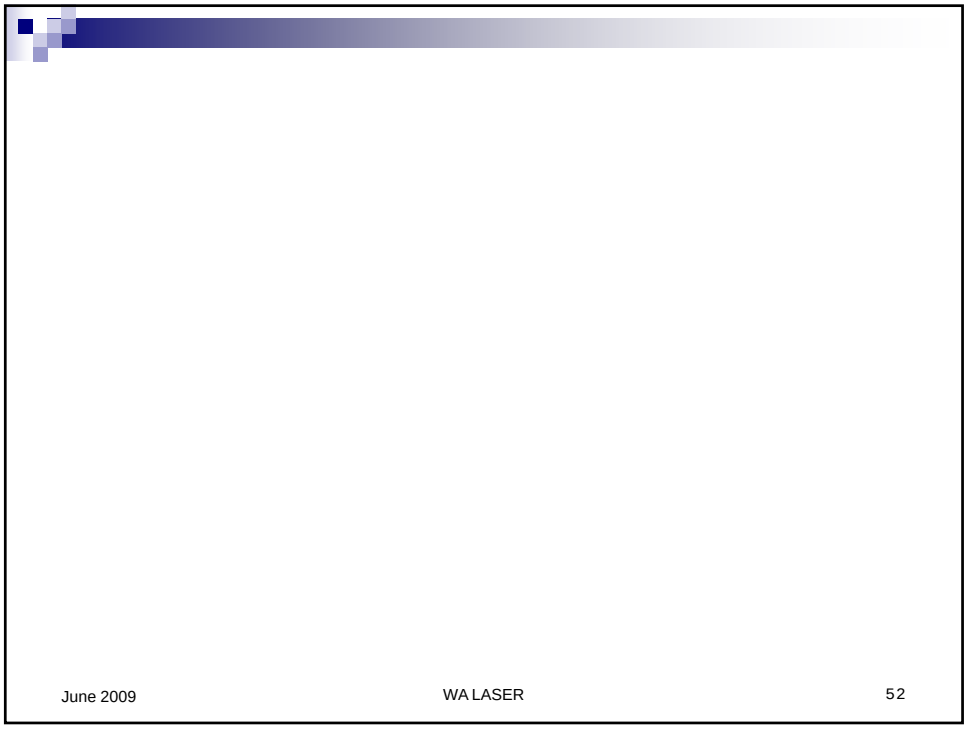
- Wastatelaser.org
- sciencenotebooks.org

Thank you for making science important to your students.





District Implementation Models

Plans for 2005-06