Ohio School Boards Association
Capital Conference and Trade Show

November 13 – 16, 2011

Greater Columbus Convention Center
Columbus, Ohio

Science instruction for the 21st century

21st Century Learning
Tuesday, November 15, 2011
3:45 p.m.
C 226

Kimberly Mullen, associate director of science and technology, ODE
Bruce Patton, professor of physics/ director, The Ohio State University/ Interdisciplinary Middle Childhood
Jerome Mescher, curriculum specialist, Hilliard City
Gordon Aubrecht, professor of physics,The Ohio State University at Marion
Rick Fogle, science teacher,Marion City

Automated Emergency Notification Program

OSBA is working for you to provide fast, effortless districtwide communication.

Leader Alert offers an automated emergency notification system for school districts. Whether it is by phone, text message, or e-mail, Leader Alert quickly sends out an automated message to the district's staff and constituents.

Contact Amanda Finney at (614) 540-4000 or (800) 589-OSBA for more information.

Please complete an online conference evaluation either during or after the event at **http://links.ohioschoolboards.org/CC11Evaluation**

OSBA Mission

OSBA leads the way to educational excellence by serving Ohio's public school board members and the diverse districts they represent through superior service and creative solutions.

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School Year Based Inquiry Learning (SYBIL)

Hilliard City Schools and The Ohio State University

- Teachers learn research-based active learning
- Students improve higher-order thinking skills
- Inquiry reduces gaps, improves benchmarks (PISA)

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SYBIL Program Design

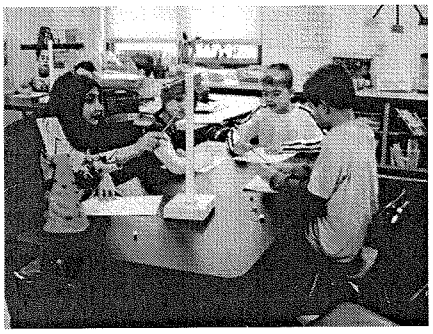
	# Users	% in school year
First year		
ES/MS	120	67%
Second Year		
ES/MS	30	85%

- First summer: 4 day inquiry-based content workshop
- School year: after-school + full/half day release content/pedagogy lessons
- Second summer: 4 day teacher-developed inquiry student lesson modules
- Second year follow-up: after-school just-in-time content/inquiry pedagogy refreshers plus 4 day science inquiry coaching workshop

Guided Inquiry Learning

- Progressive core content lessons
- Guided data taking, pattern recognition, functional relations, rule discovery
- Elicit student responses to build reasoning
  - ✓Whiteboards, groups, table-top activities
  - ✓all students engaged with teacher and peers
  - ✓at all cognitive levels
- Students fully develop and apply models

Inquiry "Lookfors"



Science Inquiry Classroom

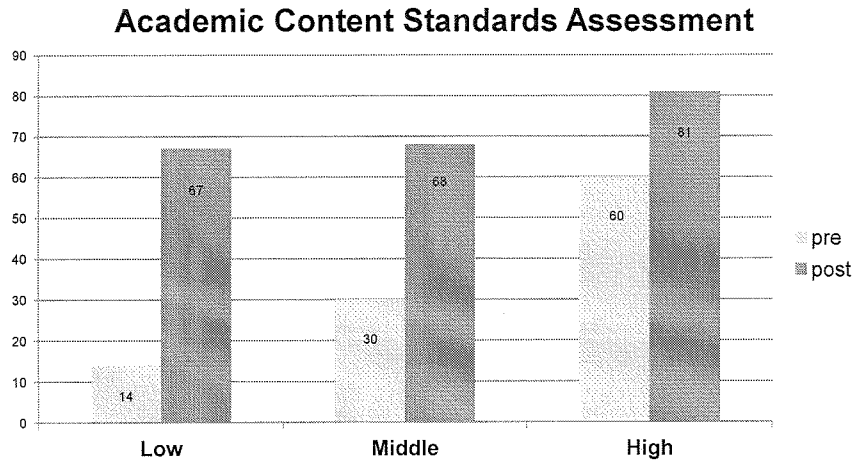
"Look-Fors"

		Comments and Observations
Student Engagement	• Students work in groups, answer questions, find explanations, and build models. • Students respond in a variety of forms, including: ➢ Motor / Tactile. ➢ Verbal. ➢ Written. ➢ Drawings / Graphical / Mathematical.	
Environment	• Student desks / tables are arranged so that students can work in groups. • Large white boards, journals, notebooks, access to computers make it possible for students to communicate, record, and analyze data / ideas. • Science resources and equipment are available and being used. • Anchor charts display concepts / ideas to connect with new experiences.	
Instructional	• Teacher circulates, works with groups, checks for understanding, and challenges students at all levels. • Teacher tries to elicit combinations of written, verbal, and tactile responses from all students. • Teacher asks guiding questions versus telling.	

Student-led ... Teacher-led

Approximate the level by placing a mark on the diagonal line.

Inquiry Decreases Student Gap



SYBIL Conclusions

- 3 key PD components:
  - Experience/Solidify Content via Inquiry
  - Design Inquiry Lessons
  - Teach Inquiry with Feedback and Support
- Large gains in attitude, confidence, content knowledge, and reasoning skills
- Large impact on higher level thinking skills relevant for improving performance on international comparisons (PISA)