

The  
"Investigative  
Science" Series

Interdisciplinary Science  
Content Courses for  
Elementary Education  
Majors

### Who Are We?

Interdisciplinary and  
Cross-College Collaboration

- Jennifer L.B. Anderson Geoscience
- W. Lee Beatty Geoscience
- John Nosek Biology
- Kim Bates Biology
- Andrew Ferstl Physics

- And 13 others since Fall 2003
- Including Chemistry and Education

### The Investigative Science Program

Science Content Courses  
for Elementary Education Majors


- Prior to 2003: Elem. Ed. majors took any two science courses



### The Investigative Science Program

Goals and Objectives

- Alleviate trepidation toward science
- Model best practices in teaching science
- Treat teachers like scientists



### The Investigative Science Program

2003 – The Original Program

- 2003 – 2008: SCIE 201 and SCIE 203
  - Interdisciplinary Science
    - Geology, Biology, Physics, and Chemistry
  - Inquiry-based, hands-on, lab format
  - Inexpensive materials, transferable lessons
  - Team-taught



### The Investigative Science Program

2008 – Major Program Redesign

- SCIE 201 – Physical Science
- SCIE 203 – Earth, Space & Life Science
- Class size = 30, 2 hour meeting time MWF
- 4 sections each semester
- One faculty member per class
- New instructors team-teach first semester

### Challenges: Interdisciplinary Curriculum

- There is no textbook
- We had trouble finding other models
- So many Standards...
- Seasonality of Earth & Life Science



### Challenges: Student Attitudes

- "Why do I need to know this? I'm only going to teach 2<sup>nd</sup> grade!"
- "Science is hard. I can't do science."



### Challenges: Administration/ Logistics

- Good news: In general, all parties are very supportive of this program
- A "service" course
- Budget
- Finding willing and able science faculty



### Challenges: Working w/ College of Education

- Appropriate advising
- Education content vs. science content



### Successes: Learning Assistants

- Undergraduate Science or Elem. Ed. majors
- Not a TA
- Many benefits
  - Students
  - Professors
  - LAs



### Successes: Local Field Work

- Use your local environment as a field area
- School campus, backyards, city buildings
- One-day field trips, if possible



### Successes: K-6 Classroom Experience

- 30 minute inquiry-based lessons
- Huge time investment!



### Successes: Data



- Pre/post tests show improvement in scientific reasoning
  - Classroom Test of Scientific Reasoning (Lawson) ~15% gain
- Pre/post evaluations show improvement in attitude toward science
  - More likely to teach science
  - More excited to teach science

### Successes: Student Comments

- "one of the most beneficial classes you can take at Winona State"
- "an EXCELLENT job of preparing you for future courses"
- "this class is the only science-related education course where you will leave feeling prepared to teach the subject"
- "SCIE 201 was a lot of work and I complained about all the work, but I am thankful that I took the class. I learned a lot."



### Lessons Learned: Impact on SCIE Faculty

- More inquiry in all classes
- Insight into student attitudes and learning
- Increased urgency to teach it right – obligated to make a difference at the K-6 level

