Teaching (Earth) Science:

Implications for K-12 instruction and teacher education
Nationwide as well as New Jersey:

- Teacher turnover rates quite high due to:
  - Retirement (of many baby-boomers)
  - Non-retirement Attrition; 2 categories
    - “older” teachers ( > age 30) leave school for another school
    - “younger” teachers ( < age 30) leave school for another field

- Heavy focus on recruitment:
  - Colleges of Education
    - Scholarships / reduced tuition
  - Districts
    - Alternative-route certification programs
What happened to teacher retention?
- Not worried about retirements
- Not worried about the changes in placements
- Worried about the young leavers

What are some strategies for increasing retention?
- Formal coursework (often graduate-level or post-bac)
- Professional Development opportunities
  - Workshops
  - Teacher inservice days
  - Conferences (such as this one)

What about blending the two issues...
- How can we combine both teacher recruitment with retention?
Pedagogical Issues

◦ It’s not about “how good of a communicator” a teacher is
◦ How do teachers focus on student learning as well as “content” coverage?
◦ Role of cognitive psychology
◦ Sequence and order of instructional events within any given lesson
  • As long as you cover activities in lesson plan, does it matter the order in which you cover them?
◦ Begin with phenomenon
Misconceptions:
- Inaccurate beliefs
- Organize and constrain learning – very similar to Thomas Kuhn’s scientific paradigms
- Highly resistant to change as concepts are tightly connected to other concepts

Dilemma of changing misconceptions
- In order to promote positive conceptual change, one must design strategies that focus on changing more than one concept simultaneously

Conceptual Change Theory:
- Learner must be dis–satisfied with initial conception… abandon it via cognitive conflict … and integrate a scientifically accepted conception (Strike & Posner, 1982/1992)
A (The?) Major Goal in Science Education

Student initial conception

(Teaching)

Scientifically-accepted conception
Problems with the generalization

- Do teachers often take misconceptions into account?
  - Since “no” how should take students’ misconceptions into account?
  - How can instruction be modified to pose a situation of cognitive conflict for the students

- Is this a new issue?
  - Since we can’t feasibly interview every student for their pre-conceptions for every concept we teach, what to do?
    - Literature base
    - Pre-instruction surveys
    - Formative assessment via discussion, etc.
What we can do as a field

- Awareness of literature on misconceptions and conceptual change
- Talk to others in the field
- Absorb everything from Professional Development opportunities
- Attend professional conferences (such as this one!)
- Don’t be afraid to try something new!
Announcements and plugs

- **Fall 2009:**
  - Conference at Kean University on Teaching Evolution

- **Spring 2010:**
  - National Science Teachers Association (NSTA) National Conference in Philadelphia
Thank You!

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