

# Teaching the Teachers: A Course in Chemistry for Chemistry Education Majors and New Teachers

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Slides available at  
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## Overview

- The Course: *The Chemistry Curriculum and the Teaching Laboratory*
  - The Origins: Where the course came from
  - What it is: The course structure
  - What we do: The course activities



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## The Origins

- Need to address specific chemical concerns
- The Perfect Storm
  - System-wide graduation requirements
  - Revised Chem Ed guidelines from ACS (2003)
- Sabbatical experience in high schools



## The Origins: ACS Guidelines

- Programs should include...
  - laboratory experimental design and preparation
  - stockroom procedures
  - safety
  - disposal of chemical waste
  - teaching assistant experience
  - the literature of chemical education



### What it is... *The Course*

- 3 credit hours – undergrad or grad
- 2 hours “lecture”, 3 hours lab per week
  - **workshop format**
- Offered odd years
- Complements *Teaching of Secondary Science* methods course



### What it is... *The Clientele*

- Junior & Senior BSEd Chemistry majors
- Graduate students
  - (MS in Curriculum & Instruction) - elective
- Current teachers – continuing education
- The mix is valuable
  - content is student driven in part
  - many points of view



## What we do...

- *First Charge to students*
  - Concerning anything we do...
    - What do you think is good?
    - What do you think is bad?
    - What would you change and how?



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## What we do... *Chemistry Topics*

- Discuss and practice teaching certain topics
  - Revisit general chem and high school topics
- High school textbook review
- Class presentation of lessons (and labs)
- Assist in general chemistry lab at BU
- Introduce/Reintroduce guided inquiry lessons
- Develop activities



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## What we do... *Chemistry Topics*

- Examples
  - dimensional analysis activity
  - stoichiometry concepts
  - particle & species views
  - chemical reaction concepts
  - others



## What we do... *Laboratory*

- Perform experiments common to high schools (prof & student presentations)
  - Identify "Purposes"
    - Chemical
    - Pedagogical
  - Students critique, sometimes rewrite
  - Discuss inquiry emphasis
- Use equipment common to high schools



## What we do... *Laboratory*

- **An example: The Popcorn Experiment**

- Previous student teacher presentation
  - mass change from kernels to popped corn
  - I presented to “class” as student teacher did
  - Class performed experiment
- Assigned to critique and rewrite materials – discovery/guided inquiry
- Re-presented with changes
- Final product – student and prof input



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## What we do... *Laboratory*

### Vernier – LabPro Equipment

- Acquaint use with TI calculators
- Try different experiments with various probes



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## What we do... *Laboratory*

- Troubleshoot freshman labs
  - Geometry/molecular modeling/Spartan activity
    - Review of principles
    - Critique of written instructions
    - Learn modeling software



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## What we do... *Laboratory*

- Fire Safety
  - Local High School Teacher
    - Volunteer fireman
    - Hazmat officer for FD
    - Discussion of combustion
    - Demos related to fire
    - Added topics
      - Recent renovation
      - Other words of wisdom



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## What we do... *Stockroom Design*

- Project
  - To learn how things are supposed to be in a stockroom
  - Students given a blank room and inventory
  - Must make it a stockroom
    - Furniture
    - Safety equipment
    - Organization of chemicals and supplies
    - Special storage units
  - Obviously, an ideal situation



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## What we do... *Resources*

- *Journal of Chemical Education*
  - Required to subscribe
- Flinn Scientific materials
- *The Chemistry Educator*
- Other print and online resources
- ACS resources



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What we do... *Workshops and  
Conferences*

- PSTA Conference  
(Pennsylvania Science Teachers Association)



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What we do...  
*Resources they take with them*

- Ton of tips
  - Lab tips – organization, safety, storage
  - Teaching tips
- Lab experiments
- Guided inquiry team exercises
- Identifying misconceptions
- On line resources



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