What Concepts Should First-Year Students Know?

2012 W. E. Harris Teaching Workshop: Concepts and Misconceptions in Chemistry
Framing the Question: What concepts should 1st-years know?

Preliminary Questions
- Who are these students?
- Why are they taking this course?
- What role does this course play?
- What do we want them to take from General Chemistry?
- Why do we want that?

Difficult Answers
- Not chemistry majors
- As the only chemistry course required of BSc’s
- Last general chemistry course in the science degree, not the first in the chemistry degree
- An understanding of the role chemistry plays in society and the world
- Scientific literacy
Framing the Question: What **concepts** should 1st-years know?

- structure / properties hierarchy
  - atoms → bonds → molecules → structure
  - physical, spectroscopic, chemical
  - reactivity, biological, pharmaceutical, environmental

- what is a chemical reaction? why and how do they go?
  - kinetics, thermodynamics
  - equilibrium
  - simple reaction patterns

- scientific method
Framing the Question:
What **concepts** should 1st-years know?

- numerical and physical scales
- chemical scientific literacy: how is chemistry relevant to... *everything*!?
Revising General Chemistry: a strategy

- accurately identify your first-year audience
- develop appropriate learning objectives
- identify learning concepts necessary for those objectives
- identify and arrange topics that promote those concepts
- jettison everything else

Do we really need to teach:

- This requires a discussion: institutionally, provincially, nationally