

# What Concepts Should First-Year Students Know?

2012 W. E. Harris Teaching Workshop:  
Concepts and Misconceptions in Chemistry

# Framing the Question: What concepts should *1<sup>st</sup>-years* know?

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## Preliminary Questions

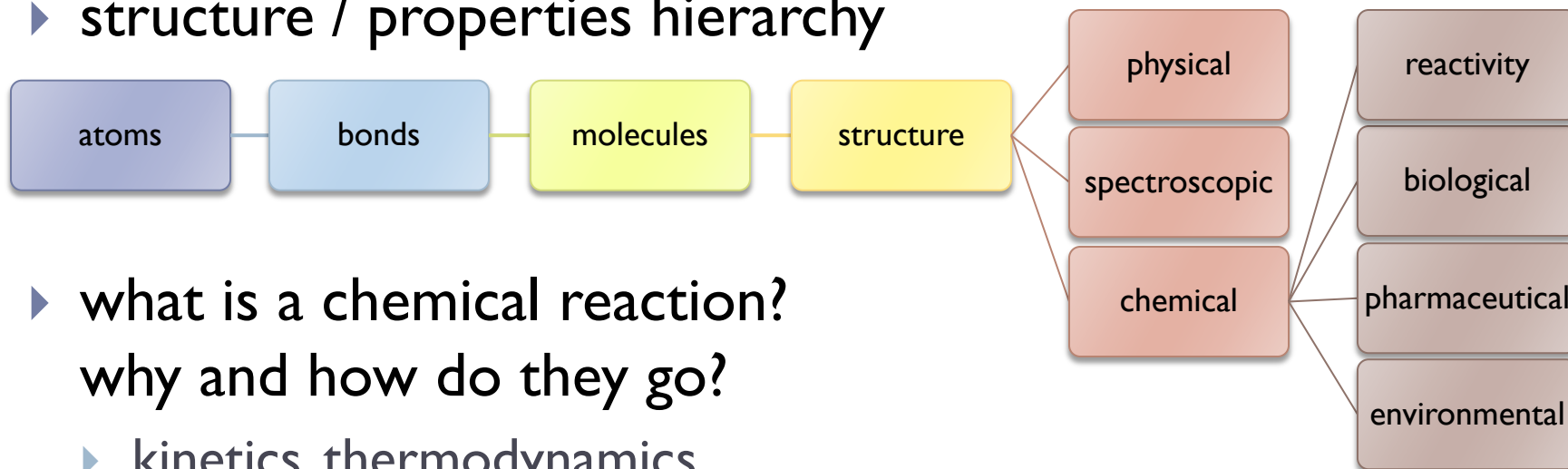
- ▶ Who are these students?
- ▶ Why are they taking this course?
- ▶ What role does this course play?
- ▶ What do we want them to take from General Chemistry?
- ▶ Why do we want that?

## 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 1<sup>st</sup>-years know?

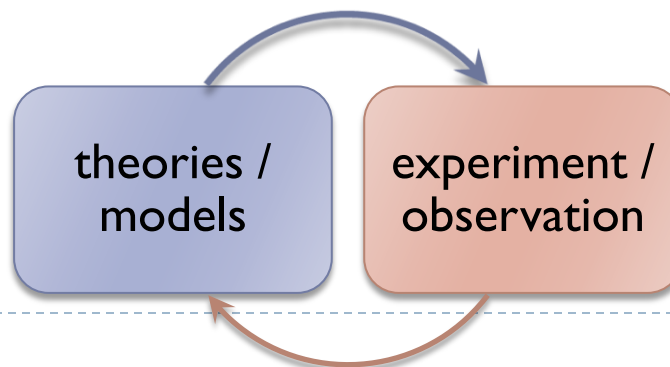
## ▶ structure / properties hierarchy



## ▶ what is a chemical reaction? why and how do they go?

- ▶ kinetics, thermodynamics
- ▶ equilibrium
- ▶ simple reaction patterns

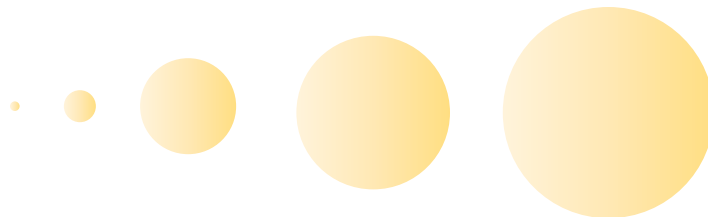
## ▶ scientific method



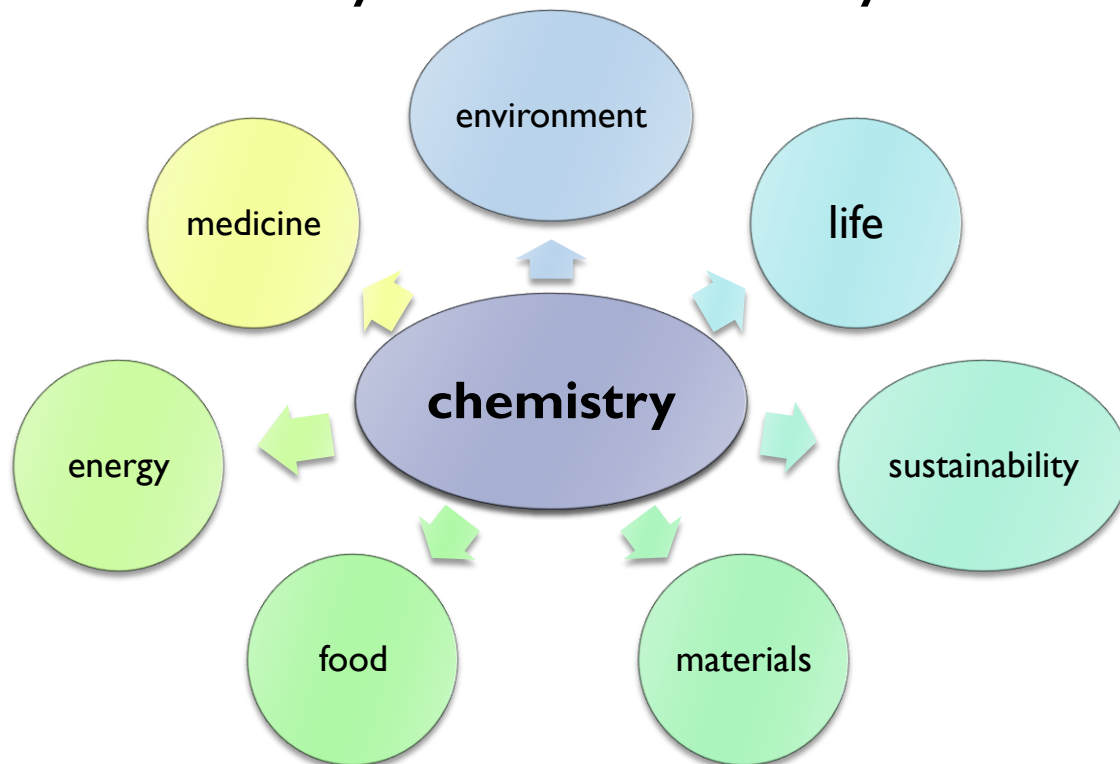
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- ▶ numerical and physical scales



- ▶ 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:

- ▶ VBT / MOT? lots of organic reactivity? electrochemistry?  
so many acid/base equilibrium problems?  
phase diagrams? solid state structures?
- ▶ This requires a discussion: institutionally, provincially, nationally