

## **Understandings to developed throughout the MCEP courses --**

- Chemistry is the central science.
- Chemistry is an experimental science where bridges are built between experimental observations and underlying concepts.
- Scientific knowledge is continually, although not steadily increasing and changing as a result of new evidence or new interpretations of old evidence under new theoretical frameworks.
- It is sometimes useful to transform qualitative ideas into quantitative expressions.
- Examples of all levels of chemistry are found in daily life and in modern human developments.
- Chemical phenomena can be represented at several levels, including macroscopic, atomic/molecular, and symbolic, and the ability to explicitly describe the relationships between these levels is a useful indicator of conceptual understanding which should be modeled for and encouraged in students.
- Metacognition, or the ability to think about one's own thinking, is a valuable way of developing and confirming understanding.
- Learning science through courses taught using research-based teaching practices will provide teacher-participants with first-hand experiences in the effectiveness of, and problems with, such practices.

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