

Appendix C: Towson’s Principles of Inquiry

Our notion of inquiry teaching and learning is aligned with the approach taken by the National Science Education Standards (NRC, 1996), which defines inquiry learning and teaching through a series of “emphasis” summaries that contrast inquiry-based teaching with more traditional teaching methods. Samples from the NSES Science Teaching and Science Content emphasis summaries (see pp. 52 and 113) are shown below.

Emphases in Inquiry-Based Science Instruction, as Defined by the NSES

Less Emphasis Should be Placed on:	More Emphasis Should be Placed on:
Verifying science content	Investigating and analyze science content
Getting an answer	Using evidence to develop or revise an explanation
Providing answers to questions	Communicating science explanations
Rigidly following curriculum	Selecting and adapting curriculum
Focusing on acquisition of information	Focusing on understanding and use of scientific ideas and inquiry processes
Lecture, text, and demonstration	Guiding students in active and extensive scientific inquiry
Asking for recitation of acquired knowledge	Providing opportunities for discussion and debate

At Towson, we have further distilled the NSES inquiry approach into our own four core principles of inquiry:

- 1. Figuring Out.** Students are figuring out science concepts and underlying mechanisms *on their own* whenever possible. (“Concepts” are differentiated from facts and terms, and “mechanism” is defined as *how* something is happening [“What’s going on?”])
- 2. Inquiry Question.** Lessons are driven by clear, common sense, contextualized, and non-obvious questions that the activities and discussions seek to answer.
- 3. Mentally Active Learning.** Lessons are minds-on as much as possible. This can be accomplished through discussions, mentally-engaging hands-on and cooperative activities, active reading, and other means, but not through lecture, reading for answers, or hands-on activities that are not mentally engaging.
- 4. Ideas and Good Reasoning/Making Sense.** Lessons focus on ideas and reasoning (making sense of things) rather than memorization of right answers and vocabulary words. Here students are developing and applying evidence-based reasoning skills, where evidence consists of everyday experiences, experimental

data, common sense, and prior knowledge. (“What do you think, why do you think that, and how do you know?”)