


HASTI – 2014
 The Indiana Science Modeling Curriculum
**Today: Our Modeling curriculum workshops
 in ICP and biology**



Northern Indiana
 Science,
 Mathematics and
 Engineering
 Collaborative

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**Status for Professional Development
 in Modeling in Indiana
 in
 Physics, Chemistry, ICP and Biology**

Summer 2013: at Hammond – 1 week each workshop
 introduction to Modeling, ICP modeling, Biology Modeling
at Notre Dame – 1 week each workshop
 Biology modeling, ICP modeling
at Carmel, University High School – 2 week workshop
 Chemistry modeling

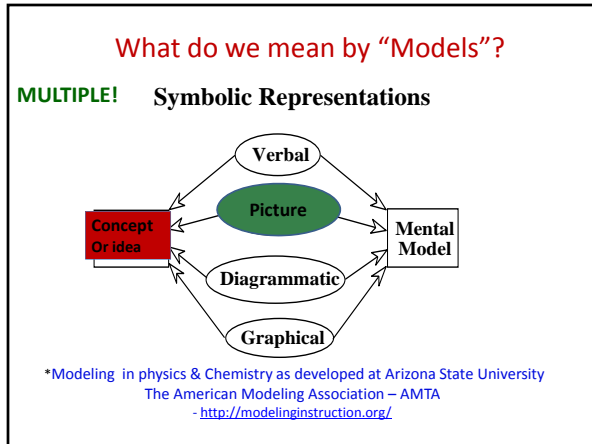
Funding support:
 IN-DOE - Math Science Partnership (2011-13) ICHE – Improving Teacher Quality (2013-14)

Results:

The ICP and Biology Modeling Curricula are now available on the NISMEC website

<http://www3.nd.edu/~nismec/nismec11.htm>
 (Password required)

- The NGSS Framework of Scientific and Engineering Practices
 “The Practice Standards”**
1. Asking questions & defining problems
 2. Developing & using models ← ←
 3. Planning & carrying out investigations
 4. Analyzing & interpreting data
 5. Using mathematics and computational thinking
 6. Constructing explanations & designing solutions
 7. Engaging in argument from evidence
 8. Obtaining, evaluating, & communicating information



- Why Models?**
- Models are basic units of knowledge
 - In all Science Research:
 - A few basic models are used again and again with only minor modifications.
 - Models help students connect
 - Macroscopic observations
 - Sub-microscopic representations
 - Symbolic representations
- The students become SCIENTISTS – learning by DOING

Why modeling?!

- To help students see science as a way of viewing the world rather than as a collection of facts.
- To make the *coherence* of scientific knowledge more evident to students by making it more explicit (quantitative).
- *Models and Systems* are explicitly recognized as major unifying ideas for all the sciences by the *AAAS Project 2061* and the *NGSS* for the reform of US science education.

Modeling Experiment With Bob and Lynda

Collecting data
Analyzing data
Discussing data

(Listening to everybody)

GLUG

Modeling Workshops in the coming year

1. Northwest Indiana – 3 weeks at Hammond
 - 16-20 June Introductory Modeling
 - 23-27 June ICP Modeling
 - 7 – 11 July Biology Modeling (at Hammond or Notre Dame)
2. Indianapolis area –at University High School, Carmel
 - 7 -15 July (not the weekend) Intro + ICP Modeling
3. Evansville area –at a Vandenburg high school
 - 7 -15 July (not the weekend) Intro + ICP Modeling

Sign up sheets at the NISMEC booth (#500) or the NISMEC website.
<http://www3.nd.edu/~nismec/nismec11.htm>
 Contact: hgberry@nd.edu

Reflecting on today's session

Who is doing the thinking and learning?
 Who is making connections?
 Did you use all 8 science practice standards?

The ABCs of learning (Mary Hynes-Berry)

Always Be Connecting
 Always Be Communicating
 Always Build Confidence

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 NISMEC: <http://www3.nd.edu/~nismec/nismec11.htm>