Assessing Student Learning

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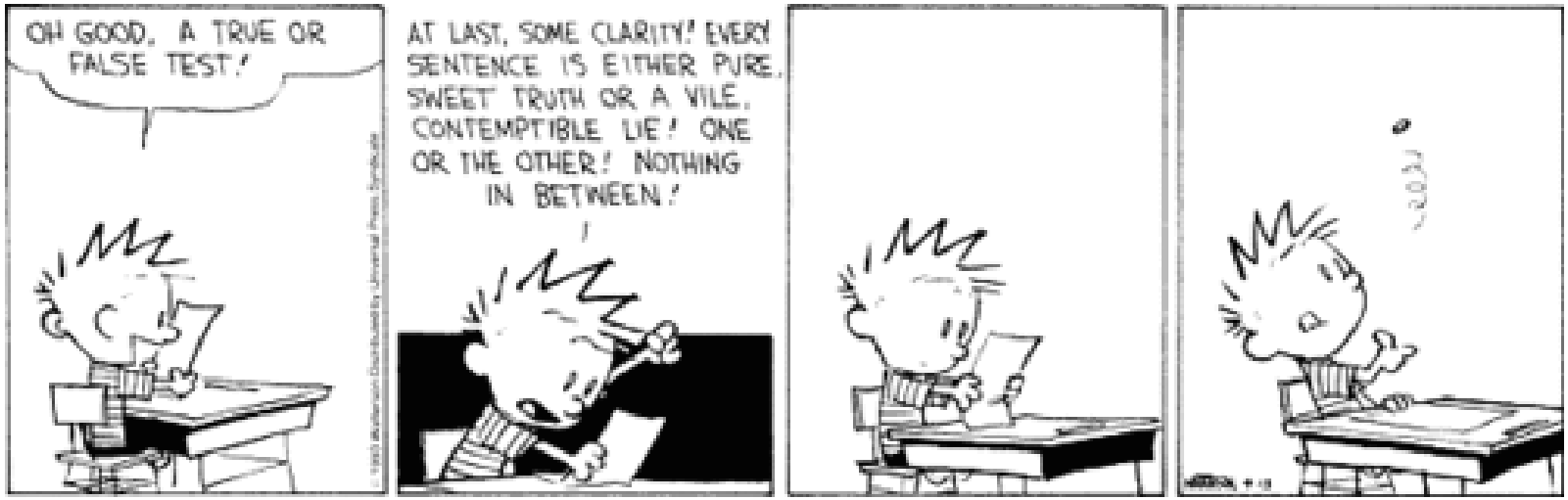
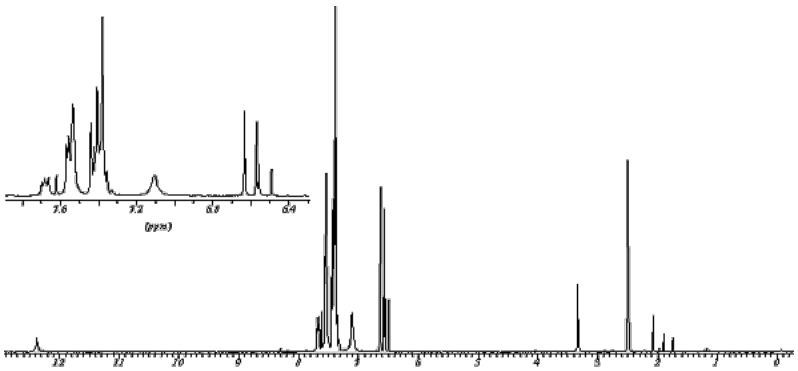
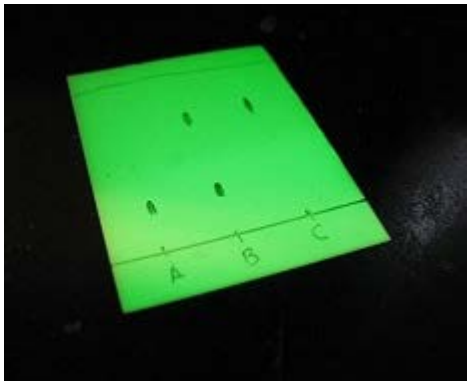
Goal: *Develop an assessment for your teachable tidbit*

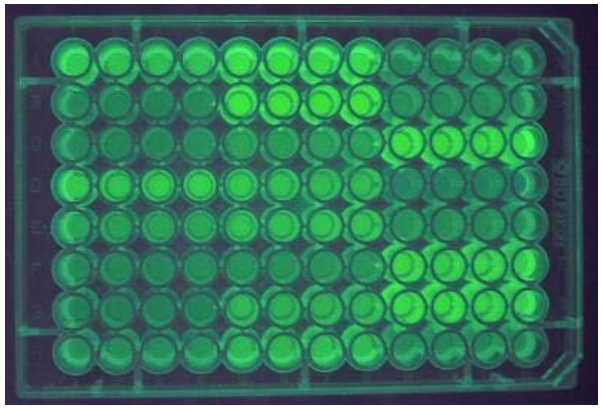


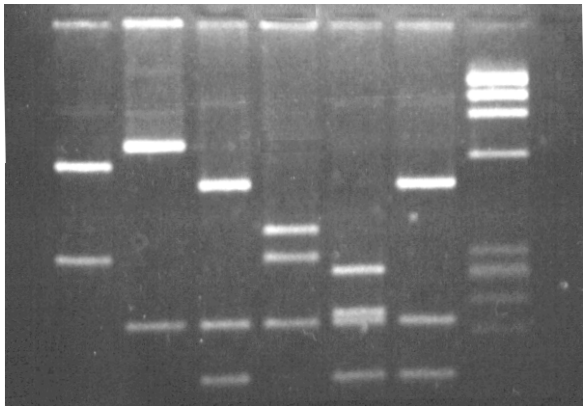
Assessment in Research

How do you know if an experiment worked?









Assessment in Teaching

Summative Assessment

- Exams, lab reports, quizzes
- Measures learning gains at the end of a unit/chapter/semester
- Used (e.g.) to assign grades, reports for departments/accreditations/students

Formative Assessment

- Measures learning gains during the lesson
- In-class polls, Just-In-Time assignments, think-pair-share exercise, etc.
- Used to shape the lesson

"When the cook tastes the soup, that's formative assessment. When the customer tastes the soup, that's summative assessment." (Paul Black)

Concept test

We are learning about electrochemical processes, and I have just explained how the Nernst equation predicts the outcome of a redox reaction.

Which of the following could be an effective formative assessment?

1. Work an example calculation on the board. Point out common errors as we go. Ask, "Any questions?"

2. Conduct a quick poll (clickers, show-of-hands) to see if the class can predict the direction of an example redox reaction.

3. Assign a Just-In-Time quiz asking students to use the Nernst equation to predict the direction of an example redox reaction.

4. Assign some homework problems out of the relevant section of the textbook.

5. All of the above!
6. None of the above!
7. Some of the above!

What just happened?

- Assessed whether we learned what a formative assessment is and how to use it
- It (hopefully!) got you reflecting on how well you've captured the concept (*Metacognition*)
- The assessment could be conducted without "assigning points" or even a normative "right answer". This particular assessment occurred during discussion.

Summative Assessment

- Syllabus is explicit about grading policies
  - Points, %, assignments (formative and summative), late work, honor code
  - Regrading policies
  - Additional policies such as dropping the lowest exam grade if the final exam grade is higher
  - Learning objectives

- Give many assessments throughout the course

- Learning objectives are defined for each exam

- A clear grading rubric is given with each assignment
  - Lab reports, writing assignments, presentations

Exams

- Exam content reflect learning objectives and course structure
  - In-class or take home exams
  - Independent and/or group exams
- Questions from colleagues and/or students
- Grade one page at a time and the following page in the reverse order
- Multiple choice exams easily provide information on student learning

Writing Assignments

- Grading Rubric given at time of assignment and clearly define terms used in Rubric
  - Content, readability, format, scholarliness, grammar, references
- Multiple drafts enhances student learning
- Peer review of papers or laboratory reports

Laboratory Assessment

- Devising experiments or research project
- Participation
- Lab notebooks
- Laboratory reports
  - clear rubric including instructions and points
- Student presentations (poster or oral)
  - clear rubric with instructions, guidelines, examples

Consider this Learning Objective

Identify a one cent coin (a “penny”) from the United States of America

Go to **www.menti.com** and use the code **92 24 24**

Consider this Learning Objective

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Go to **www.menti.com** and use the code **92 24 24**

Were you expecting this?

Identify a one cent coin (a “penny”) from the United States of America

A

B

C

D

What just happened?

- Learning objective was unclear
- Mismatch between the expectations of the instructor and the class
- The skills required to do the work were not built into the lesson
- **Should you just move on?**

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Formative assessments are an important component of any teaching unit. They ***measure the outcome*** *of the lesson. They should give you* ***actionable data.*** *They should occur frequently (i.e., multiple times per class)*

Assessment should be built to reflect the objectives of the teaching unit.

Backwards design

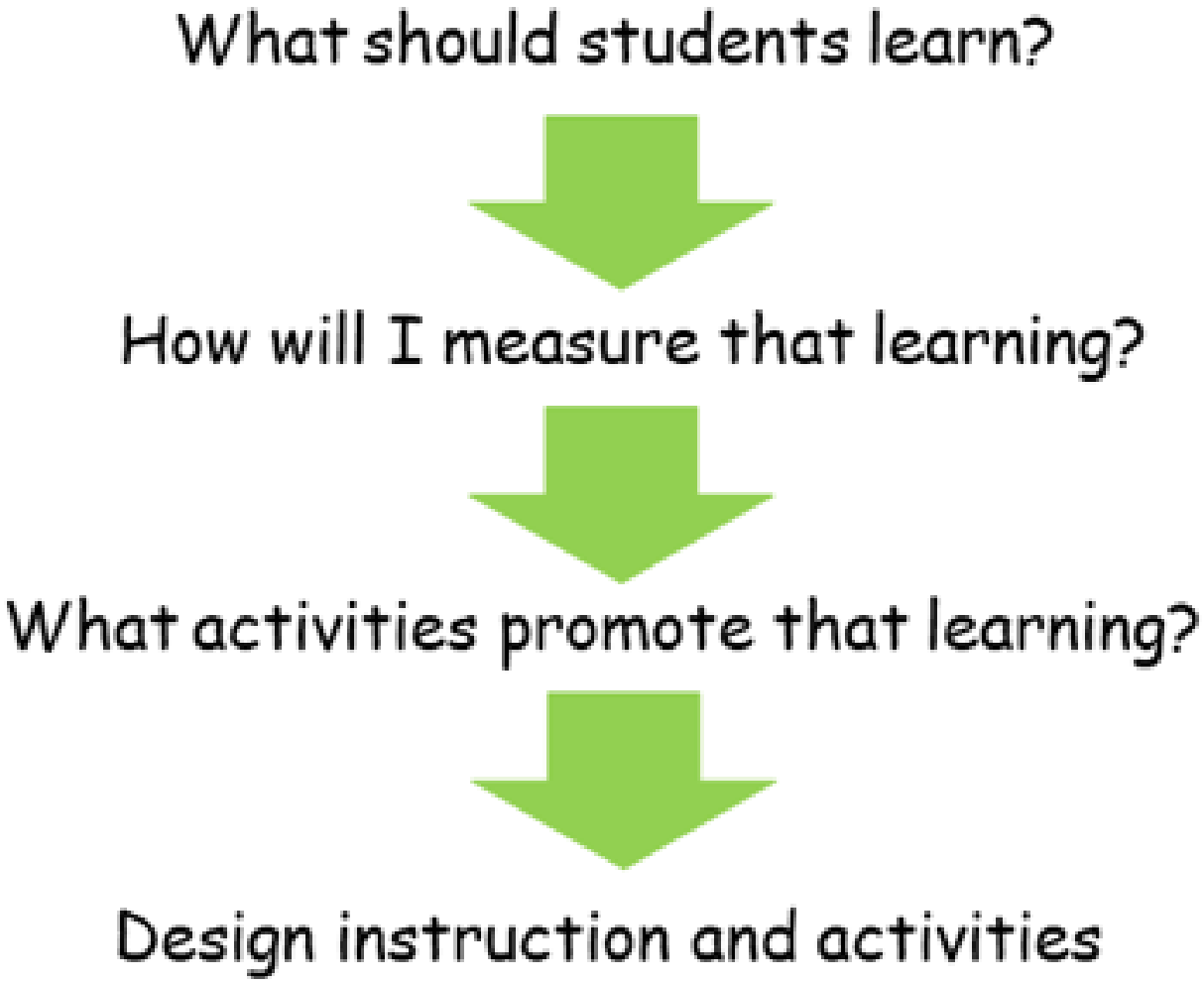


image: http://www.celt.iastate.edu/

Examples of formative assessment tools

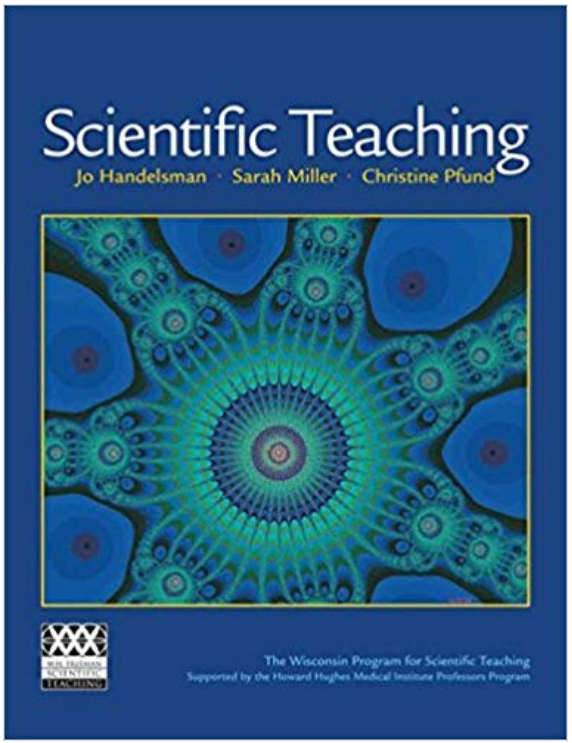
- Clicker question(s)
- Think-pair-share

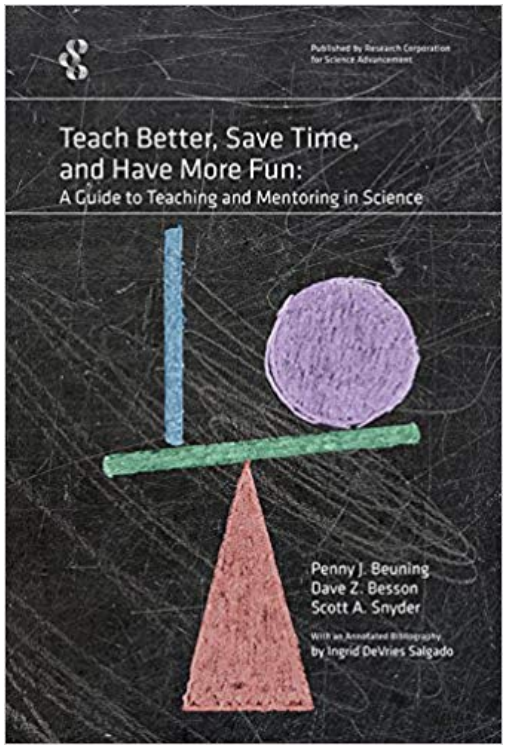
- Muddiest point
- One minute paper
- Concept mapping

- Just-In-Time exercises
- Brainstorm

- Statement correction

- And many, many more





Teachable Tidbit Time

- **Develop a formative assessment component for your tidbit**
- Focus on your learning objectives
- Decide on an assessment technique
- Can the assessment give you actionable data? ("Close the loop")