

WORKING BACKWARD TO MOVE FORWARD WITH FORMATIVE ASSESSMENT

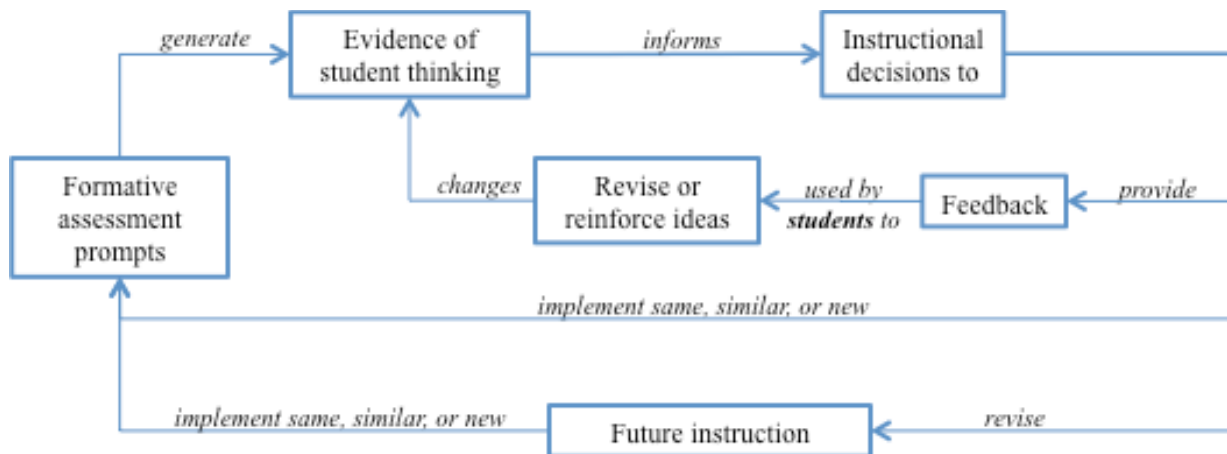
Articulating Measurable Learning Outcomes

Rather than focus on coverage of course material, a more student-centered approach to teaching strives to clearly articulate student learning outcomes and then monitor students' progress toward those outcomes. The following questions¹ can help facilitate identification of measurable learning outcomes. Answers to these questions can then be used to “work backward”² to plan both instructional activities and assessments.

1. What knowledge and skills are relevant to the subject area? What should students know and be able to do at the end of the unit or course?
2. What do proficiency and mastery in the subject area at this level in the curriculum (e.g., an introductory course or capstone seminar) look like?
3. What evidence would I accept that a student has achieved proficiency or mastery across the relevant content and skills identified in item 1? What evidence would convince my colleagues?

Feedback in Support of Learning – Integrating Assessment into the Teaching Process

Clear learning outcomes allow for the selection of assessments that will provide evidence of the extent to which students achieve these outcomes. Ideally, this information should be useful for both the instructor **and** the students for revising instruction and learning activities. Remember, **the feedback an instructor provides is only as good as the information on which it is based**. Therefore, the quality of the prompt used to gather evidence of student learning is a critical element of formative assessments.



¹ American Association for the Advancement of Science. Vision and Change: A Call to Action (AAAS Report), Washington, DC. (2010) <http://visionandchange.org> (accessed 26 April 2011).

² Wiggins, G., and J. McTighe. 2005. *Understanding by design*, 2nd edition. Assoc for Supervision and Curriculum Development, Alexandria, Virginia.

Sample Formative Assessment Techniques³⁴

1. Minute paper

Generally used at the end of the class. Give students 2-5 minutes to respond to some variation of the questions: “What was the most important thing you learned during this class?” and “What important question remains unanswered?” Students respond on an index card or half sheet of paper and turn them in as they exit the room.

2. Word journal

First, ask students to summarize a short text, lesson, or lecture in a single word. Then ask them to explain their choice in a paragraph. The result is a student-generated abstract or synopsis of the text, lesson, or lecture.

3. Direct paraphrasing

Sometimes it is important for students to develop the ability to explain highly technical or specialized information to more general audiences. This technique can be used to assess and develop that ability. To use, ask students to paraphrase in their own words part of a lecture, lesson, or text for a specific audience or purpose. For example, explain the thermodynamics of protein folding as if you were speaking to a 7th grader.

4. Think-Pair-Share

A question is posed to the class (e.g. multiple choice) and students are asked to *Think* for themselves and answer the question on their own. Often the students report this answer via a clicker (aka personal response system) or a voting card. The instructor then uses the evidence from the vote to either continue with other topics or asks student to *Pair* up with a neighboring student and *Share* with their partner their answer and, most importantly, their reasoning for choosing this answer. Students are expected to resolve conflicts and often re-vote to give the instructor feedback on how well the students understand the concept.⁵

5. Application Cards

Students are asked to write down one possible, real-world application of an important principle, theory, or procedure they just learned about.

6. Group Critique

Sometimes developing students’ abilities to critically evaluate content or text is a learning outcome. To use this technique, prepare an ill-structured example of text similar to what students would be asked to evaluate. In small groups, ask students to identify three ways to improve the text. Ask for students to share aloud with the class, turn in on an index card, or submit electronically.

³ Angelo, T.A. and Cross, K.P. 1993. *Classroom assessment techniques*, 2nd edition. Jossey-Bass, San Francisco, California.

⁴ Handelsman, J., Miller, S., and Pfund, C. 2007. *Scientific Teaching*. Freeman and Company, New York, New York.

⁵ Mazur, E. “Peer Instruction: A User’s Manual” Prentice Hall Upper Saddle River, New Jersey.