Classroom Assessment Techniques

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8:30 –10:00 AM, Wednesday, June 14, 2017.

CAT Characteristics

- Learner centered
- Teacher prompted
- Mutually beneficial
- Intended to be formative
- Faster to administer
- Faster to interpret
- Non threatening
- Ongoing

Supporting Research

Research in the effective use of CATs has consistently shown that they:

- Positively affect **motivation**, and self-perception (Sadler, 1989)
- Increase student **satisfaction** and involvement (Steadman 1993)
- Have an especially positive impact on **low achievers** (Fuchs et al., 1997)
- Improve student achievement and **reduce the time** it takes for students to grasp the content (Leahy, Lyon, Thompson, & Wiliam, 2005)
- Provide **useful information** about student learning with a much lower investment of **time** as compared to tests and papers (Angelo & Cross 1993)

What have we used so far?

- Muddiest point
- Minute paper
- Think-Pair-Share
- …

What organic chemistry topics would be the best to try muddiest point or minute paper?

Image credit: Talkin Pinata

Basic CAT steps

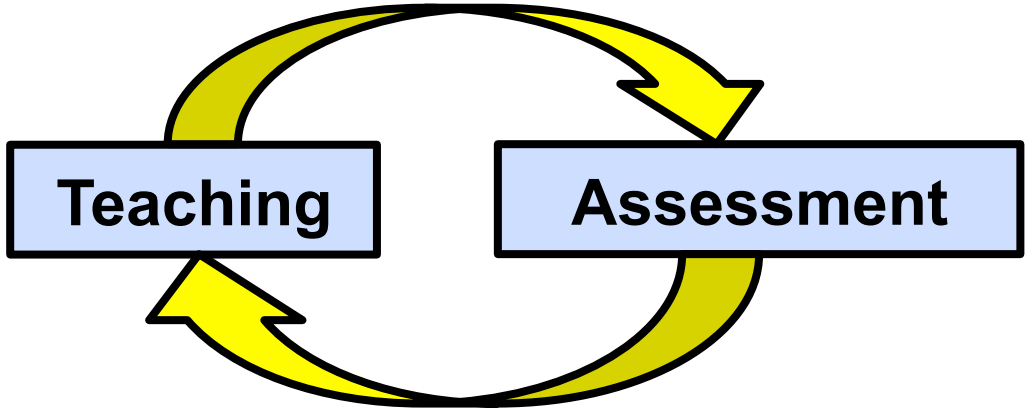
1. **Choose** a learning goal/topic to assess

2. **Choose** an assessment technique (there are many!)

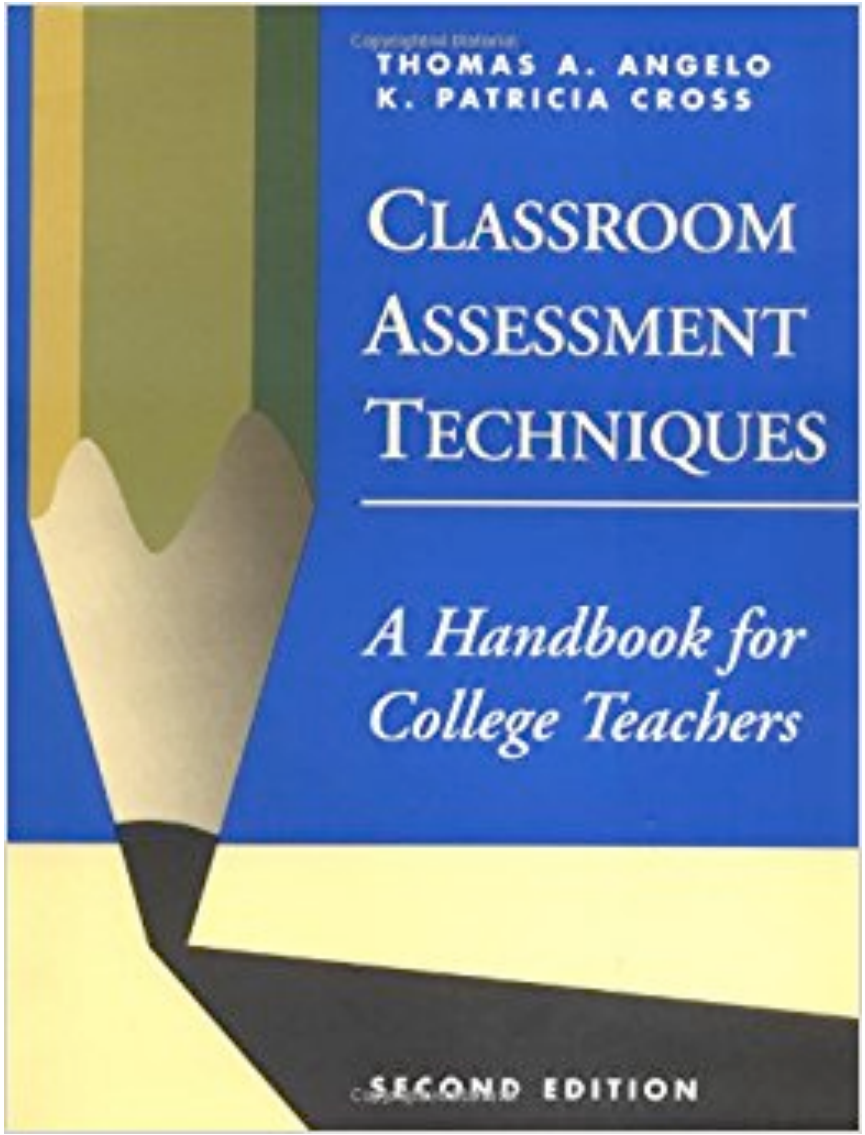
3. **Apply** the technique

4. **Analyze** the data and **share** the results with students

5. **Respond** to the data (and **make** modification as necessary)

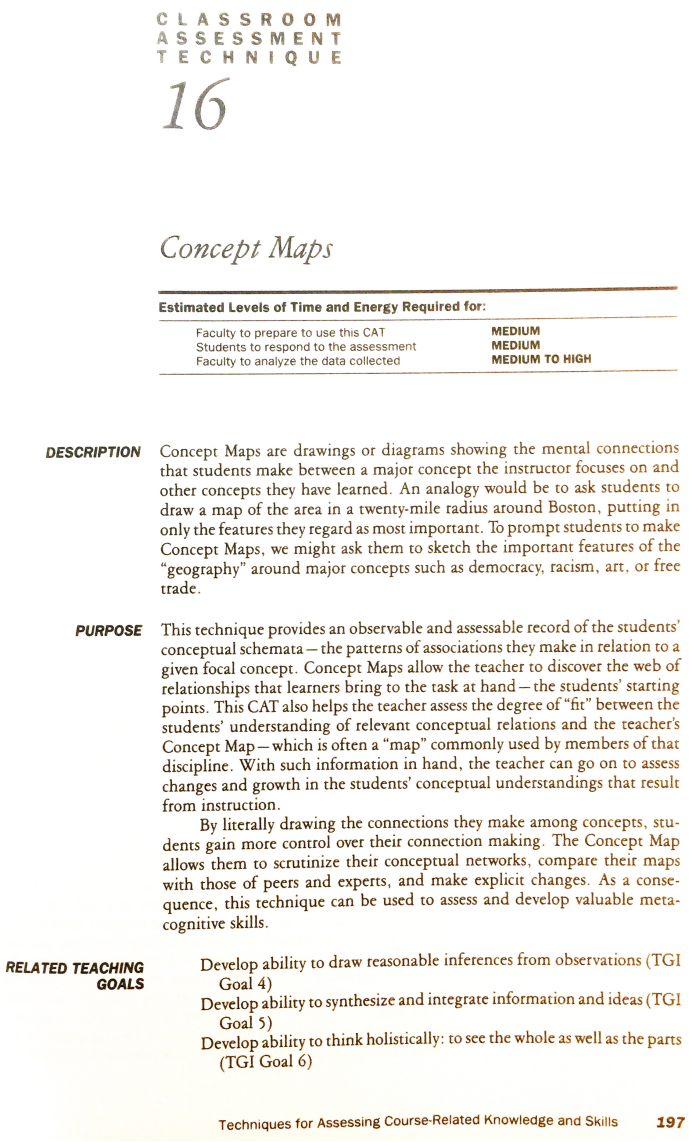


Resources: CATs by Angelo & Cross



Classroom Assessment Techniques

- Description
- Purpose
- Related teaching goals
- Suggestions for use
- Examples
- Step-by-step procedure
- Data collection
- Adapting
- Pro and Cons
- Caveats



CLASSROOM ASSESSMENT TECHNIQUE

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Concept Maps

Estimated Levels of Time and Energy Required for:	
Faculty to prepare to use this CAT	MEDIUM
Students to respond to the assessment	MEDIUM
Faculty to analyze the data collected	MEDIUM TO HIGH

DESCRIPTION Concept Maps are drawings or diagrams showing the mental connections that students make between a major concept the instructor focuses on and other concepts they have learned. An analogy would be to ask students to draw a map of the area in a twenty-mile radius around Boston, putting in only the features they regard as most important. To prompt students to make Concept Maps, we might ask them to sketch the important features of the "geography" around major concepts such as democracy, racism, art, or free trade.

PURPOSE This technique provides an observable and assessable record of the students' conceptual schemata—the patterns of associations they make in relation to a given focal concept. Concept Maps allow the teacher to discover the web of relationships that learners bring to the task at hand—the students' starting points. This CAT also helps the teacher assess the degree of "fit" between the students' understanding of relevant conceptual relations and the teacher's Concept Map—which is often a "map" commonly used by members of that discipline. With such information in hand, the teacher can go on to assess changes and growth in the students' conceptual understandings that result from instruction.

By literally drawing the connections they make among concepts, students gain more control over their connection making. The Concept Map allows them to scrutinize their conceptual networks, compare their maps with those of peers and experts, and make explicit changes. As a consequence, this technique can be used to assess and develop valuable metacognitive skills.

RELATED TEACHING GOALS

Develop ability to draw reasonable inferences from observations (TGI Goal 4)
Develop ability to synthesize and integrate information and ideas (TGI Goal 5)
Develop ability to think holistically: to see the whole as well as the parts (TGI Goal 6)

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Classroom Assessment Techniques

- CAT 8 – Categorization Grid
- CAT 16 – Concept Maps
- CAT 21 – Documented Problem Solutions
- CAT 24 – Application Cards
- CAT 25 – Student-Generated Test Questions

Jigsaw

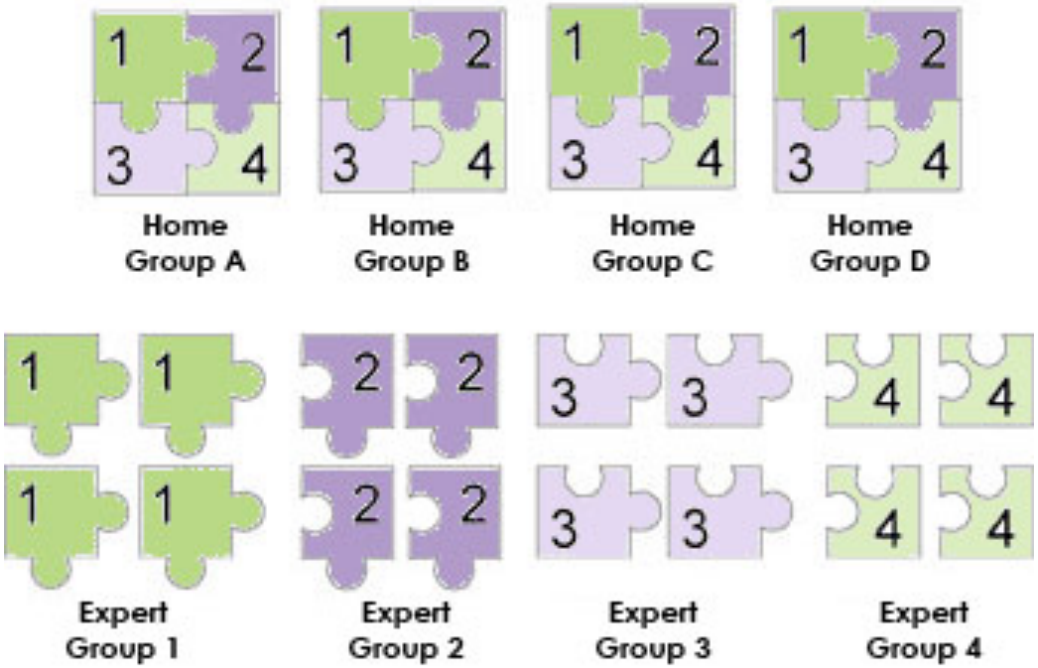

Image credit: U of Toronto

Home Group
Form a group that has 5 members
with **different** compounds on the cards

Expert Group
Form a group that has 5 members
with **same** compounds on the cards

In your expert team, read the handout and develop 3-5 min chemistry specific introduction of this CAT for your home group.

Basketane CAT 8 – Categorization Grid
Penguinone CAT 16 – Concept Maps
Pagodane CAT 21 – Documented Problem Solutions
Sulflower CAT 24 – Application Cards
Churchane CAT 25 – Student-Generated Test Questions

References

Angelo, T.A., and Cross, K.P. (1993) *Classroom Assessment Techniques: A Handbook for College Teachers*, 2nd ed. San Francisco: Jossey-Bass.

Fuchs, L. S., Fuchs, D., Karns, K., Hamlett, C. L., Katzaroff, M., & Dutka, S. (1997). Effects of task-focused goals on low-achieving students with and without learning disabilities. *American Educational Research Journal*, *34*, 513-543.

Leahy, S., Lyon, C., Thompson, M., & Wiliam, D. (2005). Classroom assessment: Minute by minute, day by day, *Educational Leadership*, *63*, 19-24.

Sadler, R. (1989). Formative assessment and the design of instructional systems. *Instructional Science, 18*, 119-144.

Steadman, M. (1998) Using classroom assessment to change both learning and teaching, *New Directions for Teaching and Learning*, *75*, 23-35.