

# Assessing Students' Understanding

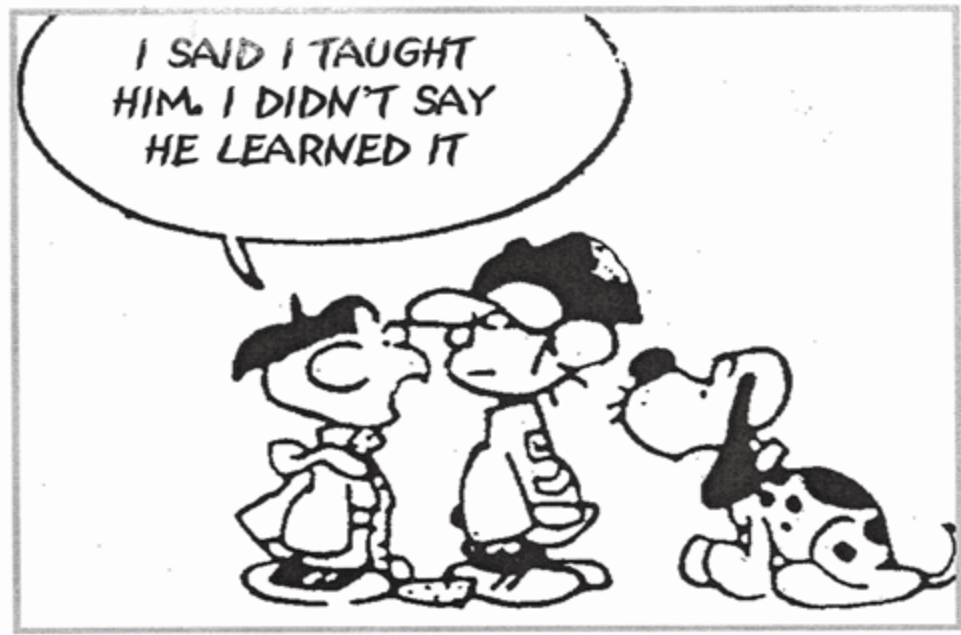
Jennifer Kosiak

University of Wisconsin – La Crosse

[kosiak.jenn@uwlax.edu](mailto:kosiak.jenn@uwlax.edu)

<http://www.uwlax.edu/faculty/kosiak/projects>





I taught a lesson but the wrong class showed up. - *anonymous*

# How will we know if each student has learned it?

- Assessment should not merely be done *to* students; rather, it should also be done *for* students, to guide and enhance their learning.

*The National Council of Teachers of Mathematics, Assessment Principle*

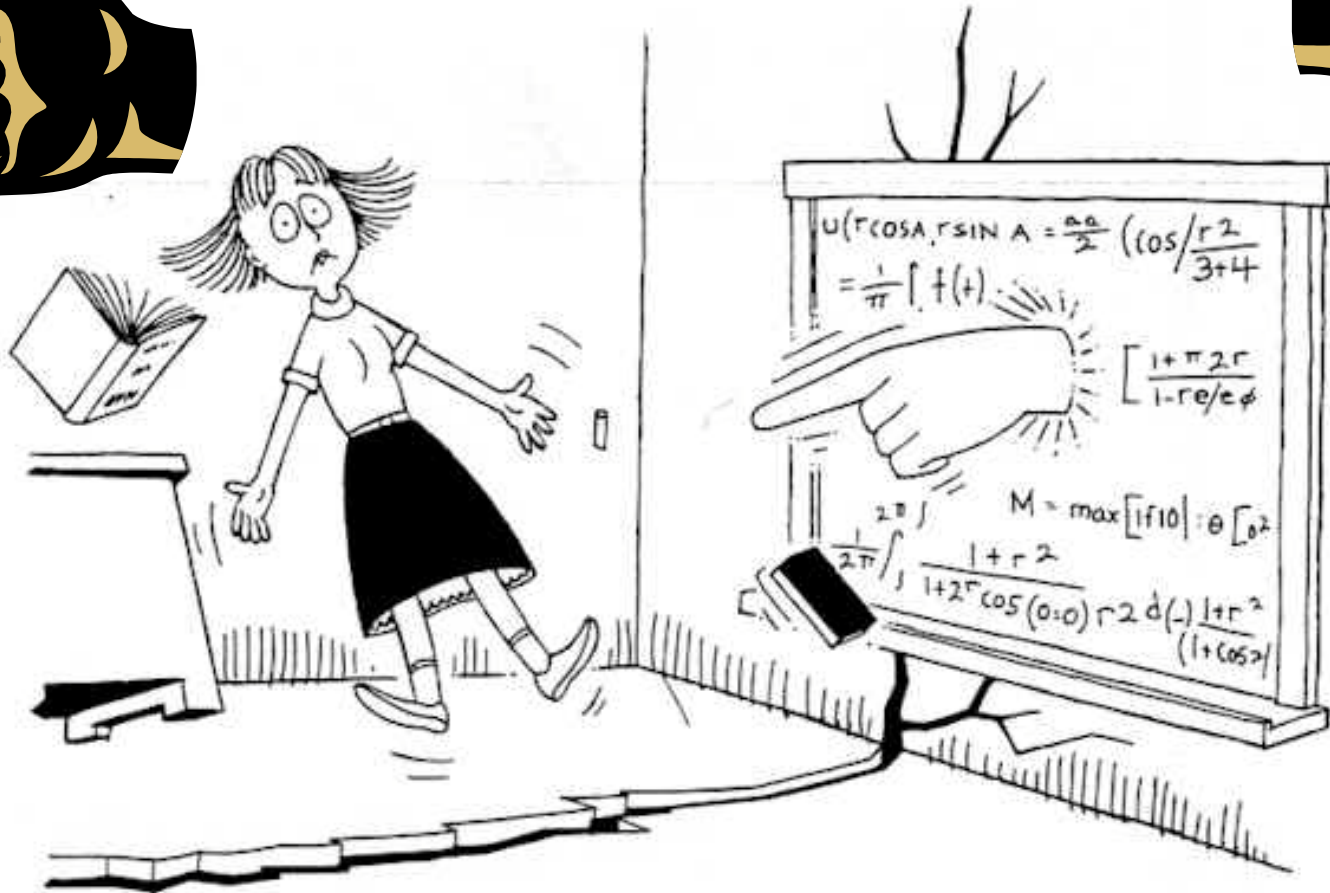
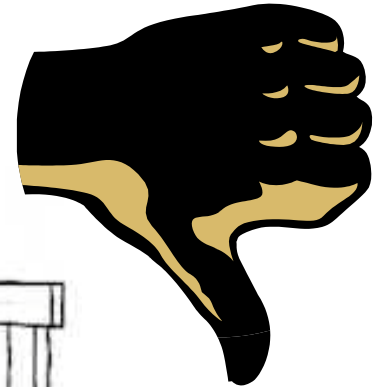
- Assessment is not an end in itself but a vehicle for educational improvement.

# FAST FACTs

## *Formative Assessment Classroom Techniques*

- **Launch:** Identify preconceptions or misconceptions
- **Explore:** Build understanding
- **Summarize:** Connect and formalize understanding
- **Reflect:** Assessing their own cognition

# Thumbs Up or Thumbs Down

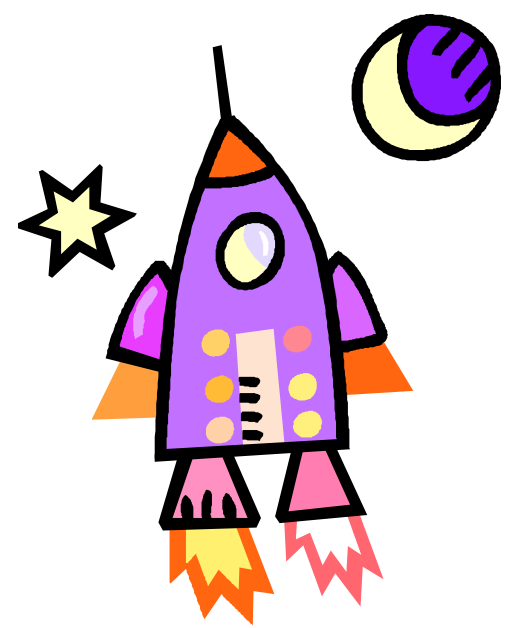


"NO, NO, NO WRONG AGAIN!"

**FACT OR FICTION:** Half of the college students in the U.S. have math anxiety.

# LAUNCH

- Brain Storm
- Word Splash
- Knowledge Rating
  - Thumbs Up/Down
- Homework Checks
  - Entrance Slip (HW or Defn)
  - Pick of the Day
  - Tic-Tac-Homework



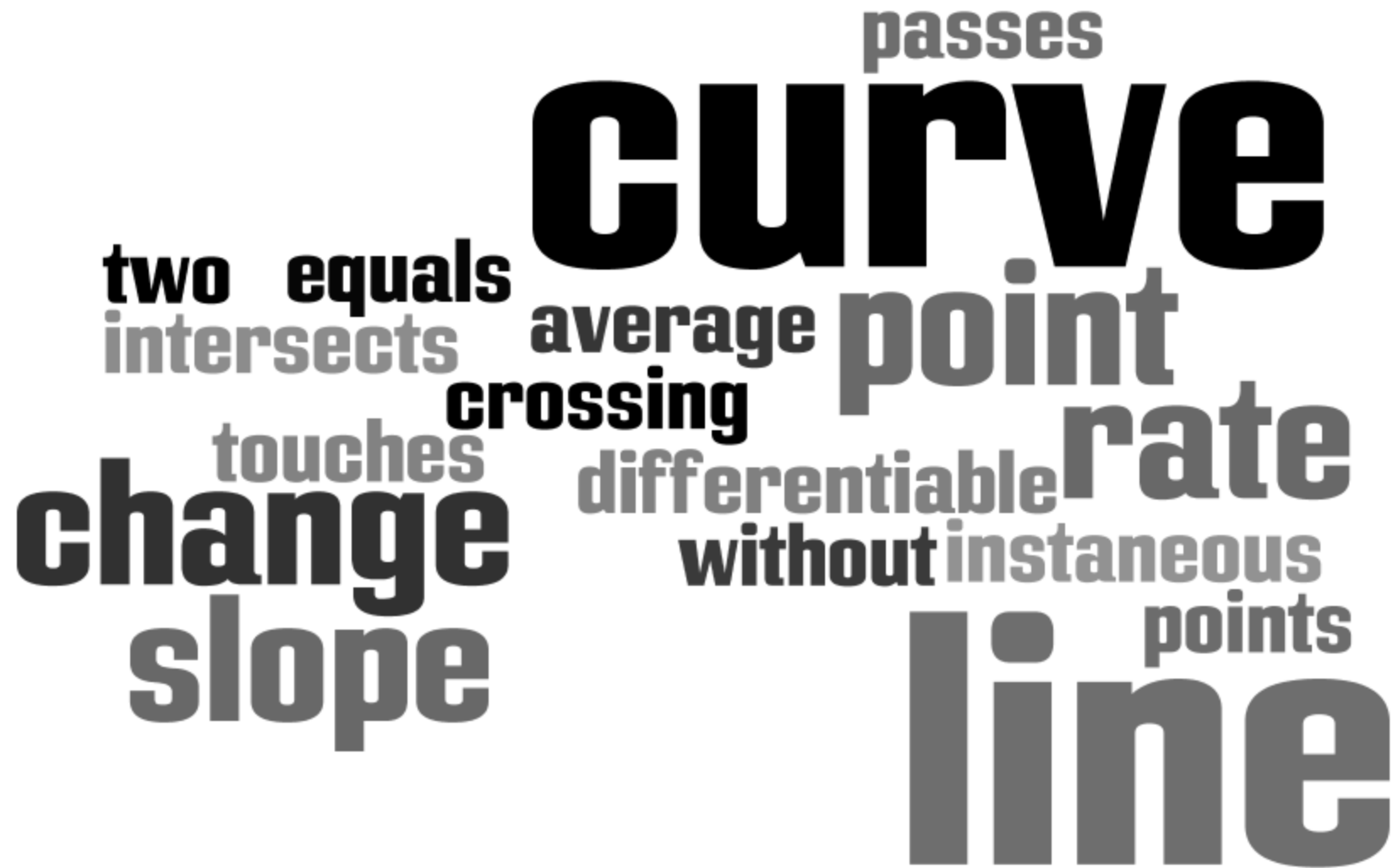
$$f'(c) = \frac{f(b) - f(a)}{b - a}$$



# Word Splash – MVT & FTC

**CLOSED**  
**DIFFERENTIABLE**  
**ANTIDERIVATIVE**  
**INDEFINITE**  
**CONTINUOUS**  
**EXISTS**  
**FUNCTION**  
**OPEN**  
**POINT**  
**INTERVAL**  
**INTEGRAL**

# WordSplash – Secant and Tangent Lines

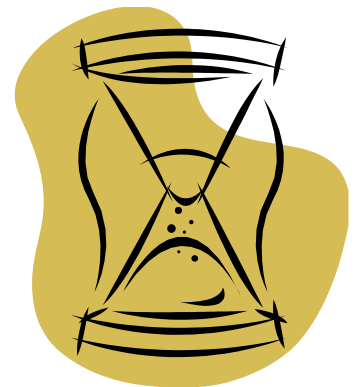




## FACT OR FICTION

The average teacher wait time for questions is 1.4 seconds.

Entrance Slip:  
Pick of the Day  
Student HW Presentations





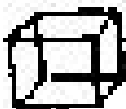
Mon	Wed	Thurs
12	7	22

Tic-Tac-Homework

HELLO CLASS! ... THIS IS THE FORMULA FOR A TRIANGLE.



$$E = MD \odot \pi 2X^2 + 3 \text{ eggs}$$
$$X + \frac{0}{2} \frac{1}{2} \text{ truck} - \frac{37^3}{X - \odot}$$

GQ = 37  = \$ 0.1.

+  $\frac{3}{4}$  of  $\frac{2x}{6 \text{ pills}}$

JR

# EXPLORE

- C<sup>3</sup> - Collaborative Clued Corrections
- VVWA – Visual and Verbal Word Association
  - Concept of Definition Map
  - Frayer Model
- Class Discussions
  - Ten and Two
  - Three Minute Pause
  - Think Pair Share

# C<sup>3</sup> - Collaborative Clued Corrections

Find the inverse of  $f(x) = \sqrt{x} - 3$

$$y = \sqrt{x} - 3$$

$$x = \sqrt{y} - 3$$

$$x + 3 = \sqrt{y}$$

$$(x + 3)^2 = y$$

$$x^2 + 9 = y$$

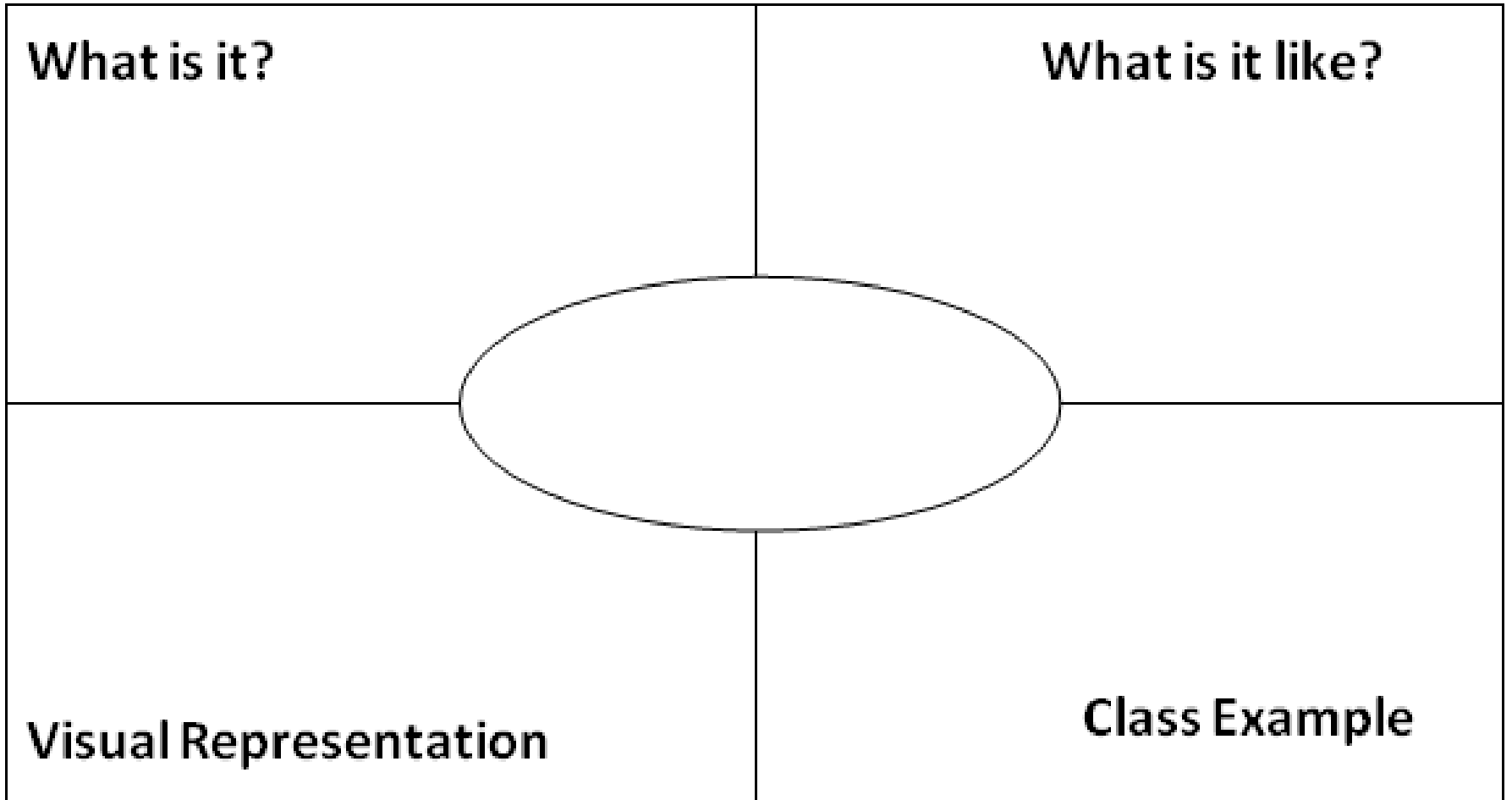
$$f^{-1}(x) = x^2 + 9$$

Your process for finding the inverse is correct. You have one algebraic error -- review!

How could you verify your result?

What is the domain and range of  $f^{-1}(x)$ ?

# VVWA



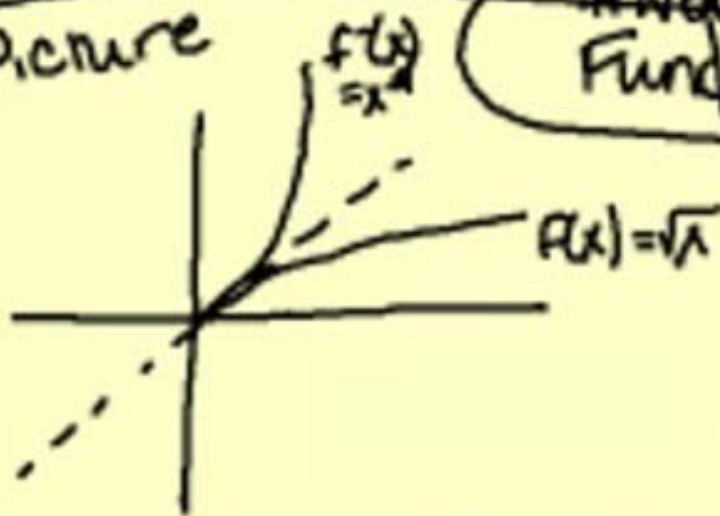
# VVWA

What is it

It is the function that results when you switch  $x$  and  $y$  and solve for  $y$  again.

What is it like  
opposite operations  
reflection  
undoing  
switching  
confusing 😞

Picture



Inverse  
Function

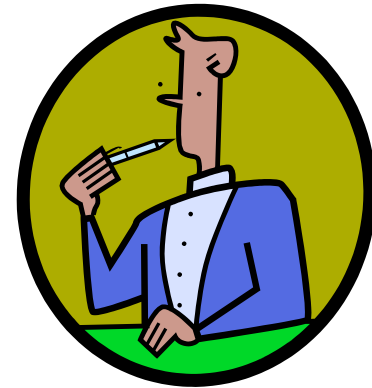
Example

$$\begin{aligned}f(x) &= 2x + 3 \\y &= 2x + 3 \\x &= 2y + 3 \\ \frac{x-3}{2} &= y = f^{-1}(x)\end{aligned}$$

# Ten and Two

FACT OR FICTION:

The average college student attention span is 40 minutes.



**Students only have '10-minute attention span'**

# SUMMARIZE

- Two-Column Feedback Quiz
- Quick Writes or Exit Slips
  - Directed Paraphrasing – What have you learned (use appropriate vocabulary and notation).
  - Three Minute Paper
  - 3-2-1 Summary

$$\log_4(x) - \log_4(x-1) = \frac{1}{2}$$

$$\log_4(x^2 - x) = \frac{1}{2}$$

$$4^{1/2} = x^2 - x$$

$$2 = x^2 - x$$

$$0 = x^2 - x - 2$$

$$0 = (x-2)(x+1)$$

$$x=2 \quad x=-1$$

$$x=2 \quad x=-1$$

# Feedback Quiz



"What do you expect? My edition of the math book doesn't have the answers in it like yours does."

## 3-2-1 Summary

- 3 POMS (Points of Most Significance)
- 2 Muddiest Points
- 1 Interesting Idea

# REFLECT

- SALG – Student Assessment of Learning Gains
- Post-Mortem

## **Post-Mortem on Examination 2**

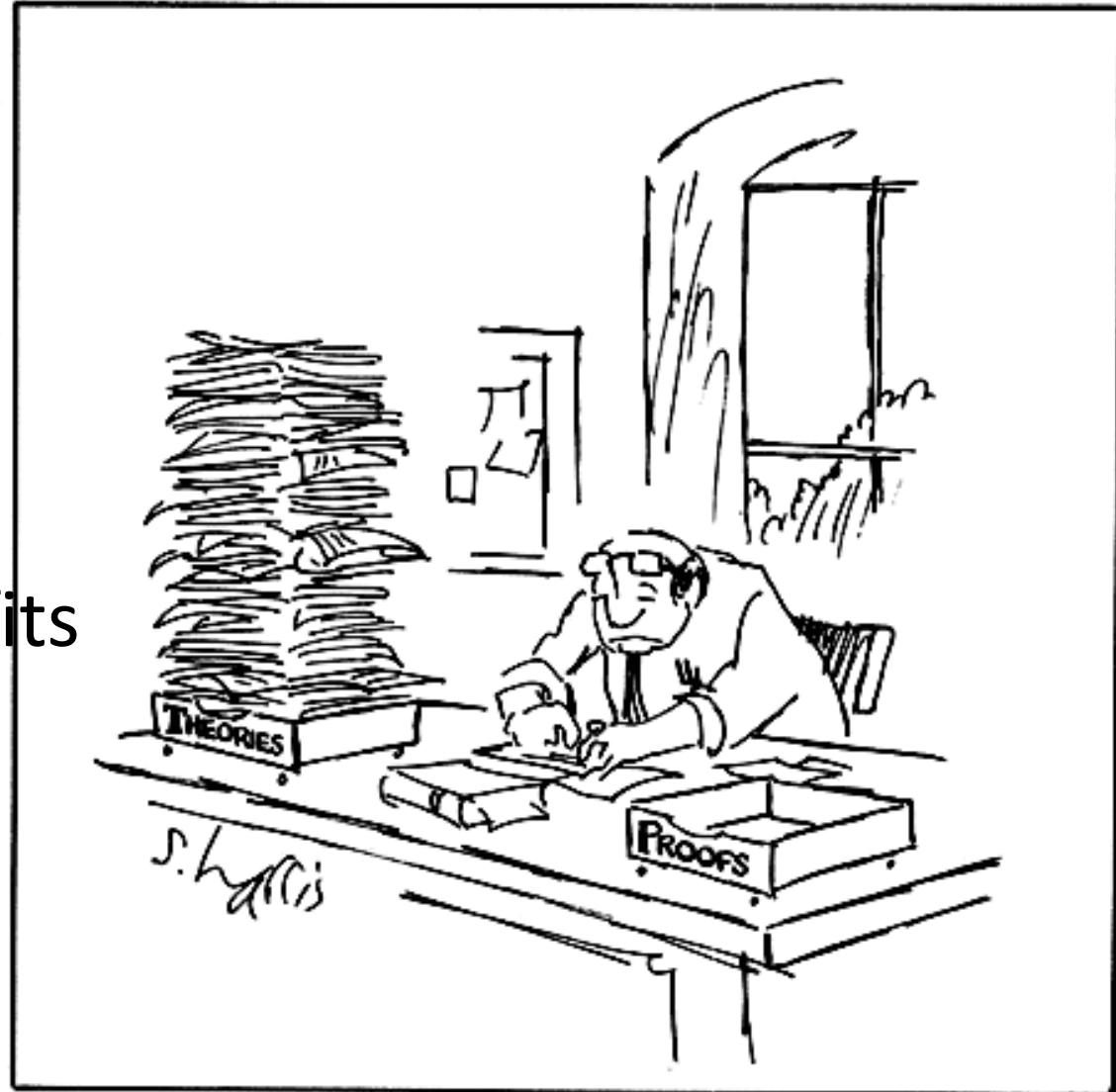
Name: \_\_\_\_\_

Grade on Exam 1: \_\_\_\_\_ on Exam 2: \_\_\_\_\_

1. Please comment on your preparation for Exam 2 compared to Exam 1.
2. How do you think this has affected your performance on Exam 2? (If you are still not satisfied with your performance, you should see me in office hours if you have not already done so.)

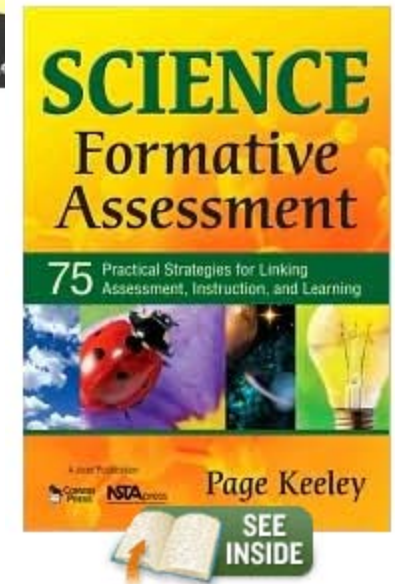
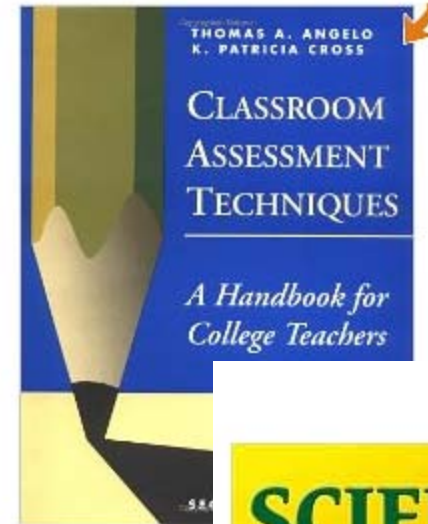
# Get the FACTs!

- Content Validity
- Engagement
- Flexibility
- Ease of Use
- Reciprocal Benefits
- Impact



# Great References

- Angelo, Thomas A. and K. Patricia Cross, 1993, *Classroom Assessment Techniques: A Handbook for College Teachers*, Second Edition, San Francisco: Jossey-Bass Publishers.
- Keeley, Page D., 2008, *Science Formative Assessment: 75 Practical Strategies for Linking Assessment, Instruction, and Learning*



# Field-tested Learning Assessment Guide

## Classroom Assessment Techniques:

<http://www.flaguide.org>

Collaborative Learning  
Technology (LT<sup>2</sup>)

### Field-tested Learning Assessment Guide

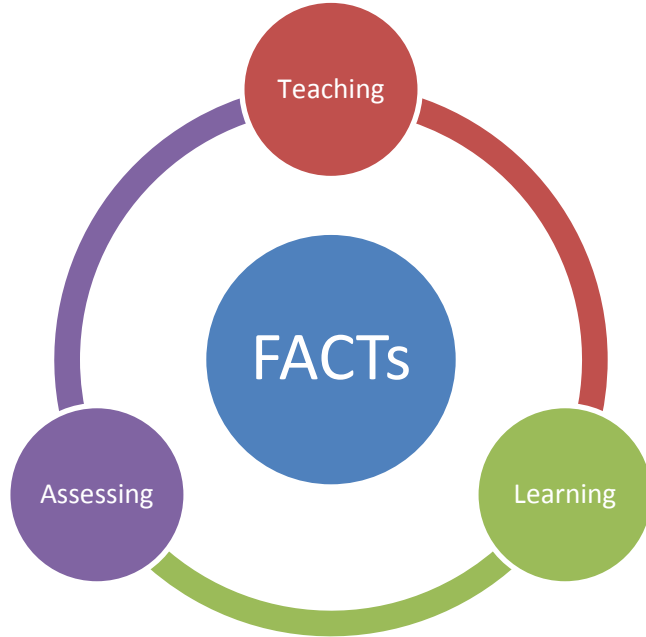
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Jennifer Kosiak

University of Wisconsin – La Crosse

[kosiak.jenn@uwlax.edu](mailto:kosiak.jenn@uwlax.edu)

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