Small Changes
Make Big Impact

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Your Favorite Math Class

1) So far, what have you taught?
   
   \((1^*)\) What you think you taught …?

2) So far, what have they learned?

   \((2^*)\) What they think they learned…?

What meaningful learning will stay with them?
Your Favorite Math Class

1) TEACHING...? self assessment

(1*) What *you think* you taught ...?

2) LEARNING...? self assessment

(2*) What *they think* they learned...?

What meaningful learning will stay with them?
We will streamline constructivist staff development through the experiential based learning process.

We will revolutionize technology-infused technologies for our 21st Century learners.

We will harness thematic schemas through cognitive disequilibrium.

We will iterate learner-centered interfaces through high impact practices.

We will iterate brain-compatible school-to-work programs within the new paradigm.

We will iterate assessment-driven methodologies within professional learning communities.

http://www.sciencegeek.net/lingo.html
What is your role as a citizen?

Judge a man by his questions, rather than his answers.

~ Voltaire
One Single Idea

Computers are useless.
They can only give you answers.

~ Pablo Picasso
What are your catalyst gifts to your students?
Sir Ken Robinson

“Creativity is as important as literacy.”

“Curiosity is the engine of achievement.”

“If you're not prepared to be wrong, you'll never come up with anything original.”
~ Power of Small ~

The Teeny-Weeny Catalysts

unknown/curiosity

failure/creativity
~ Power of Small ~

“I always thought math was:

Here’s a hammer.
Here’s a nail.

HIT IT.”

You are the first math teacher who said

“Play With It”
Maybe... our emphasis should be:
Not how much we can teach,

but how little can you teach?
~ Power of Small ~

What are your catalyst gifts to your students?

little changes

little interferences
~ Scoring Scale ~

4  3  2  1

100%  75%  50%  25%
~ In class quizzes ~

• **Self-quiz:**
  students answer questions.
  they self grade before going over it in class.

• **Graded-grade-quiz:**
  students answer questions.
  they self grade before submitting.
  I grade their grading.

• **Graded-quiz:**
  students answer questions.
  they self grade before submitting.
  I grade their solution.
~ Scoring Scale ~

3
(Yay)
Yes

2
(Meh)
Maybe

1
(Nay)
No

Gauging Questions
~ Taking tests ~

- **Scan/Rate:**
  scan the entire test.
  rate each question Y/N/M

- **Answer Questions:**
  answer questions in the order of Y-M-N

- **Review:**
  check Y questions—for errors
  redo/attempt M questions—best you can
~ Spiralling / Interleaving ~

• **Keep it Short & Frequent:**
  pick questions that are reasonable length
  give it daily/weekly

• **Space it out & Randomize:**
  pick questions from a variety of topics
  from past.

• **Focus on Difficulty & Time:**
  pick questions that need reviewing.
  make note of time improvement.
\[(2x - 3)^2 = ? \quad = 4x^2 - 12x + 9\]

\[25x^2 + 30x + 9 = ? \quad = (5x + 3)^2\]

\[4x^2 + ?x + 25 = (?+?)^2\]

\[4x^2 + 30x + ? = (?+?)^2\]
\[ A = \frac{1}{2} h (a + b) \]

\[ \frac{A}{\frac{1}{2}h} = a + b \]

\[ \frac{A}{\frac{1}{2}h} - a = b \]
\[ \sqrt{x + 26} = x + 6 \]

\[ \frac{1}{x^2} + \frac{1}{26^2} = x + 6 \]
\[ i^3 \cdot i^8 \cdot i^2 \]
\[
\frac{3^2}{\left(\sqrt{x}\right)^2}
\]
• **Start of class:**
  quick recap of last class

• **During class:**
  frequent, low stakes, 
  & **short** (weekly) quizzes

• **End of class:**
  quick recap of highlights of this class
~ Thinking Process ~

- **Start of problem:**
  don’t start; predict: estimate, gauge, guess; expect; not just the answer, but the process

- **During problem:**
  Connect related concepts.
  provide only the blueprint of the idea.
  Let them **PLAY**.

- **End of problem:**
  don’t stop; reflect; check; **evaluate**;
  not just the answer, but the process.
• **Share stories:**
  provide *examples* of your own failures.

• **Steer errors to ideas:**
  tell them it’s wrong,
  but ask them to figure out *why*.
  point out how they have a good idea buried inside the error.

• **Celebrate/learn from mistakes:**
  discuss mistakes with a positive tone
  point out it’s *normal*
• **Why learn math?:**

  share YOUR stories.
Small Teaching
James Lang
Jose - Bass (A Wiley Brand)