

Conceptual Layering

A Teaching Strategy for Inclusion

Start with the simplest form of the concept

Begin with concrete, manipulative, visual

Multiple ways to “see a concept”

Representations are related, not isolated

Deep understanding resides in relationships

Practice a concept until sufficient mastery

Extensions are provided

Gradual transition in the learner’s mind

No stage needs extensive practice time

Concepts are incrementally layered so that the increase in complexity is gradual

Conceptual layering reflects the brain's natural learning style. Our brains seek complexity and challenges, but they prefer this to be done in an incremental way. Our brains are attracted to the interestingly unusual, and are attracted by a mild degree of confusion.

In many textbooks, when a new concept is introduced, the initial examples and practice problems will entail decimals, fractions, and integers.

The learners focus so much mental effort on the arithmetic, they often fail to comprehend the overarching concept being taught. Conceptual layering is the solution to this problem, and offers the surest way for students to achieve success in mathematics.

The Rule of Three

Brains need repetition in order to remember things and to enable to brain/body to function at a high level.

When ideas, words, and processes are thoughtfully repeated (**with intent**), there is a strengthening of the electrical current in the brain along a certain pathway. This leads to a better ability to reconstruct this pathway in the future, and leads to the ability to see similarities and differences to this pathway.

Powerful Collaboration

What works well for you?

What works well in more than one course?

What can you share with a colleague?

What can you brag about?

What do you want to do better?

What answers are you looking for?

These are great questions to think about during Collaboration Time.

Reflection

Reinforcing

Note taking

Extending

Language of Mathematics

Every computer needs an operating system, which is the interface between the user and the computer.

Similarly, every brain has an operating system – its language. When we talk with students about math, we use language; specifically, the language of math. This has particular terms, symbols, and structure, just as any (foreign) language does.

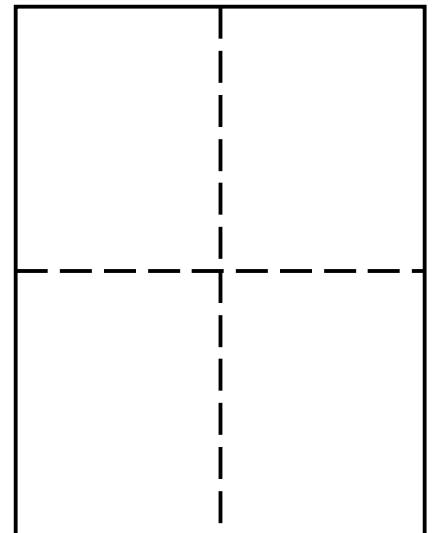
It's the math teacher's job to work with this language so that students are comfortable and conversant with the use of this math language. Math teachers can do this in a fashion similar to that of a Spanish or French teacher.

EZ - Writes

The Liberation of Language in the Math Classroom

Using language properly brings new depth to instruction in the classroom.

Take some scratch paper and cut it up into four pieces. Hand these out to your students after working for awhile with a new concept – this use of language works best after students have time to experience a concept or algorithm.



Ask students to recall something about the lesson; it really doesn't matter a great deal what you ask. The mere fact that you ask for recall will require that they use their memory to reconstruct the lesson.

Warmups – Some Thoughts

Can be almost anything

Review from yesterday's lesson

Extend yesterday's homework

Part of a series of Layered Concepts

Puzzle – Game – Challenge (**revisit**)

Simple – Average – Advanced

STAR questions and modifications

Set the tone for the day

Engages the mind and gives it brain food

The Art of Questioning

Proper questions posed at the right time lead students toward deeper understanding and make them:

- ✓ Better problem solvers
- ✓ Better thinkers
- ✓ More organized
- ✓ Better at pattern recognition
- ✓ Retain information longer

Perfect Practice

The Amateur:

"I'm going to practice until I get it right."

(once)

Then they close the book and watch TV.

- - - - -

The Professional:

"I'm going to practice until I can't get it wrong."

(ever)

Then they perform flawlessly with ease.

- - - - -

Your Students:

What are you modeling for them?

? ? ? ? ? ? ?

They will let you know on the next test.