DIFFERENTIATING INSTRUCTION EFFECTIVELY BASED ON CLASSROOM ACTIVITIES AND ASSESSMENTS
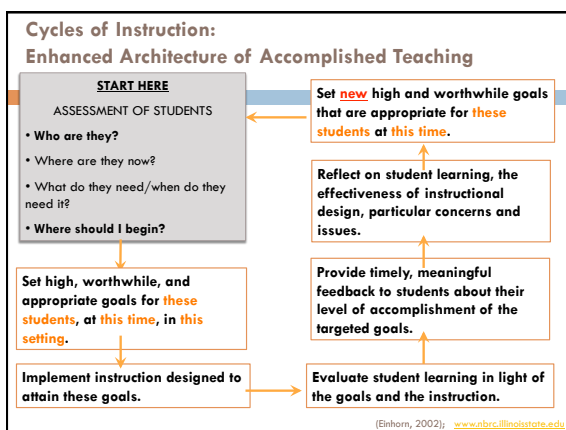
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What will you learn in this session?

- How learning progressions/trajectories can help improve instruction
- How to use class work more effectively
- How to differentiate instruction and find resources
- Comments? Feedback?

Cycles of Instruction:
Enhanced Architecture of Accomplished Teaching

START HERE

ASSESSMENT OF STUDENTS

- **Who are they?**
- Where are they now?
- What do they need/when do they need it?
- **Where should I begin?**

Set **new** high and worthwhile goals that are appropriate for **these students** at **this time**.

Reflect on student learning, the effectiveness of instructional design, particular concerns and issues.

Set high, worthwhile, and appropriate goals for **these students**, at **this time**, in **this setting**.

Provide timely, meaningful feedback to students about their level of accomplishment of the targeted goals.

Implement instruction designed to attain these goals.

Evaluate student learning in light of the goals and the instruction.

(Einhorn, 2002); www.nbrc.illinoisstate.edu

What is a learning progression/ trajectory?

- An empirically supported developmental progression of how students move through successive refinements from informal to complex ideas, taking into consideration needed instructional practices, tasks, and tools.

- Common Core State Standards
  - "Provide a consistent, clear understanding of what students are expected to learn"
  - Adopted by many states
  - Includes the *Standards* and the *Mathematical Practices*

(Confrey et al, 2010); www.corestandards.org

Learning progressions / trajectories

- Identify a content area and the goal level understanding
- Recognize that children's background knowledge are diverse and are a relevant starting point
- Represent the "expected tendencies" of the development of math understanding
- Emphasize meaningful and well-ordered instruction and encourage interaction and reflection
- Are based upon research and continue to be validated by empirical studies in classrooms

(Confrey et al, 2010)

Learning Progressions on the Web

- Learning Progression Frameworks Designed for Use with the CCSS in Mathematics K-12, Karin K Hess:
  - Http://www.nciea.org/publications/Math_LPF_KH11.pdf
- Progressions Documents for the Common Core Math Standards
  - http://ime.math.arizona.edu/progressions/#products
- Learning Progressions connected to the CCSS in poster format ($20 each)
  - http://www.wirelessgeneration.com/posters

Evaluating a student's response

- Did the student's work reflect understanding of the goals?
- Did the student exhibit typical responses? Did the student show more or less understanding?
- Did the student interpret the activity differently than intended (i.e varying knowledge and cultural backgrounds)?
- What was the range of student responses within the classroom? How does this inform subsequent instruction?

Differentiating Instruction: Feedback

- **Feedback is a form of differentiation**
- Provide immediate feedback
  - Connected to moving learning forward
  - Feedback can be from teacher, **self-assessment**, and/or classmate feedback
  - Give feedback in ways that students learn more
    - i.e. Feedback is based on a plan/expectation/theory of how student will progress – student should have a sense of where they are headed

(Black & Wiliam, 1998)

Differentiating Instruction: Use Curricular Materials

- Within a Curriculum

  - Reading the teacher's materials

  - Get materials from prior and subsequent grades

- Vary the content, the process, and/or the product of what already exists

Differentiating Instruction: SCAMPER

- **SCAMPER is based on the notion that everything new is a modification of something that already exists.** Each letter in the acronym represents a different way you can play with the characteristics of what is challenging you to trigger new ideas:
- **S** = Substitute
- **C** = Combine
- **A** = Adapt
- **M** = Magnify/Minify/Modify
- **P** = Put to Other Uses
- **E** = Eliminate (or Minify)
- **R** = Rearrange (or Reverse)

Retrieved at: http://litemind.com/scamper/
Also helpful: http://www.brainstorming.co.uk/tutorials/scampertutorial.html

CCSS

- Common Core State Standards http://www.corestandards.org/
- Model Content Frameworks http://www.parcconline.org/parcc-content-frameworks
- Compare NAEP to Common Core http://www.achieve.org/comparing-common-core-state-standards-mathematics-and-naep-framework
- Achieve   http://www.achieve.org/PARCC
- Smarter Balanced Assessment Consortium http://www.smarterbalanced.org/resources-events/faqs/

Resources for Teachers

- Student-created problems – grade the exercise one year, then edit and use to differentiate instruction the following year
- Ken Ken from Math Forum
- Illuminations or other web-based resources (i.e. Sheppard Math)
- Figure This! Problems from http://www.nctm.org/
- Dynamath Magazine; Scholastic math
- TOPS math cards
- Logic problems
- Marcy Cook tile problems
- Critical Thinking Press: Building Thinking Skills –
  - http://www.criticalthinking.com
- Great Source - Daily Math
  - http://www.greatsource.com