Problem Solving and Effective Teaching Practices (Hybrid)

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COURSE PURPOSE

The purpose of this course is to build teachers' understanding of the cognitive processes in problem solving, equip teachers with effective mathematics teaching practices to uncover and expand students' mathematical thinking and disposition, and foster student-centered, discourse-rich learning environments.

Meetings *(Note: in person meetings may change to virtual meetings based on the health guidelines.)*

- Six in-person meetings at RESA 8:30 - 3:30
- Virtual small group meetings
- Coaching meetings: Two coaching cycles, virtual & in person meetings, classroom visits

LEARNER OUTCOMES:

1. *Knowledge:* Participants will gain an understanding of the cognitive processes in problem solving, common problem types and strategies students use, ways to transform tasks to promote reasoning, as well as the progression of learning in Numbers in Base Ten (NBT) and Operations & Algebraic Thinking.

2. *Practice:* Teachers will become familiar with and implement Effective Mathematics Teaching Practices *(NCTM, 2014)* to promote Standards for Mathematical Practices in their classrooms.

3. *Participants will learn to:*

    - ❏ Implement Effective Mathematics Teaching Practices.
    - ❏ Facilitate meaningful classroom discourse centered around problem solving
    - ❏ Design/Select problems according to their mathematical demands and recognize student responses in terms of cognitive development and disposition.
    - ❏ Pose purposeful questions to develop students' ability to reason with numbers, contextual problems, and to communicate mathematically.
    - ❏ Promote and connect students' meaningful use of mathematical representations (contextual, physical, visual, verbal, and symbolic).
    - ❏ Represent students' mathematical thinking in algebraic expressions and equations.

BOOKS

Taking Actions: Implementing Effective Mathematics Teaching Practices in Grades K-5 (Provided)
Children's Mathematics: Cognitively Guided Instruction (Suggested)

Grades K-1 Meeting Dates and Topics

Date	Session Topics/Assignments	Assignment Due
Sept. 15, 2020 8:30-3:30 Session	**Session 1. Introduction to Problem Solving: Cognitive Process, Tasks, and Facilitation**	Pre-course survey

Recording	• Cognitive processes involved in problem solving • Common problem types and strategy development • Early Numeracy & problem solving progression • Cognitively Guided Instruction, 3-Act Tasks, and other models that promote reasoning and problem solving Assignment: Complete Reflection #1. Collect student work samples from the selected lesson	
Oct. 6, 2020 8:30-3:30	**Session 2. Delving into Students' Thinking & Strategies Progression, Representation, & Connection** • Strategies students use to solve problems • Mathematical principles & properties • Representing students' thinking • 5 *Practices for Orchestrating Productive Mathematics Discussions:* Anticipating, Monitoring, Selecting, Sequencing, and Connecting Assignment: Use the anticipation chart. Collect student work and teacher recording. Complete Reflection #2.	Reflection #1 Bring: Class Set of student work samples Read: Assigned chapters
Nov. 10, 2020 8:30-3:30	**Session 3. Breathing Inquiry into the Classroom; Purposeful Problems, Purposeful Questioning, Productive Discourse** • Posing Questions for Teaching and Learning • Eliciting Evidence of Student Thinking • Transforming tasks • Representations and mathematical communication • Algebraically Transferrable Mathematical Communication Assignment: Transformed Task, Anticipation chart, Reflection 3: Questions and Discourse Student work samples	Reflection #2 Bring: anticipation chart, Ss work samples, and T recordings Read: Assigned chapters
Coaching Cycle Begins		
Jan. 12, 2021 8:30-3:30	**Session 4. Building Procedural Fluency from Conceptual Understanding** • Fluency in whole number reasoning and measurement • From problem solving to procedural fluency • Use and connect multiple representations • Developing Strategic Fluency • Exposure, Experience, and Expectations Assignment: Complete the problem based lesson assignment. Collect all artifacts. Complete reflection #4	Reflection #3 Problem based Micro-teaching lesson plan Bring: Ss work samples & T recordings
Coaching Cycle Continued		

Feb. 9, 2021 8:30-3:30	**Session 5. Putting It All Together (SMP & MTP)** • 3 D's of the Cognitively Active Classroom • Taking Action: Connecting SMP and MTP	Final Reflection Bring: Class set of student work samples (post)
Coaching Cycle Continued		
Mar. 2, 2021 Changed . (Read Across America Day) **New Date:** **March 16, 2021** 8:30-3:30	**Session 6. Reflecting Back, Moving Forward** • Games That Promote Spatial/Visual Reasoning, Problem Solving, and Productive Struggle • Final Reflection Presentation and Celebration	Final Reflection Bring: Class set of student work samples (post)

How This Course is Assessed

Northeast Georgia RESA uses the Guskey model to evaluate courses offered. This class will use 5 levels of evaluation.

Level 1- Participants' reactions

Level 2- Participants' learning

Level 3- Organization Support and Change

Level 4- Participants' Use of New Knowledge and Skills

Level 5- Student Learning Outcomes

PL Feedback	PL Feedback Ticket Out the Door Work Samples	Coaching Cycle Follow-up session Observations & Feedback References	Coaching Cycle Instructional Observation & feedback	Progress Tracker Student Work Samples Performance Tasks & Rubrics