

OFFICE OF PROFESSIONAL LEARNING



— March 2025 Education Bulletin —

Welcome to the March 2025 edition of the **Luzerne Intermediate Unit (LIU) Office of Professional Learning's (OPL)** monthly education bulletin. The intent of this communication is to provide subscribers with:

- Professional learning opportunities offered by our department,
- Provide school leaders with educational policy support, and
- Provide tips for practicing educators.

This special edition of the OPL Education Bulletin is part IV of a four-part series dedicated to all of the teachers that teach mathematics in grades K through 5. We hope this issue gives you a few ideas to dig into to improve your practices.

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WHY ELEMENTARY MATH? - PART IV

MATH TEACHING PEDAGOGY - STUDENT THINKING

Student assessment data reveals areas where instruction can benefit from incorporating research-based practices. While many factors contribute to a student's mathematical struggles, many of these lie beyond a teacher's control. A focus on specific, effective instructional practices can be controlled. We encourage you to consider the following strategies with the hope that they will expand the number of tools in your "instructional toolbox".



- **Part I: Student Readiness using the Instructional Hierarchy Framework**
- **Part II: Interleaved Mathematical Practice**
- **Part III: Solving "Word Problems" using Schema-Based Instruction in Lieu of Keywords**
- **Part IV: Student Mimicking versus Student Thinking**

In this edition, the focal instructional technique is the concept of engaging students in thinking in the K-5 Mathematics classroom—really, any math classroom. A text that is quickly gaining traction in many math teacher's libraries of professional publications is the book, *Building Thinking Classrooms in Mathematics*, by author Peter Liljedahl. This text poses some interesting and dramatic changes in instructional design that are worth exploring. However, please know that while there is some research behind this publication, it is still relatively new and has spawned some criticism. For this reason, this bulletin will not explore much from this text. However, the author does raise a good question. Do our students truly engage in thinking in our classrooms? Consider even the best of our students...Are they good at mimicking our expectations or are they engaged in constructing new knowledge through exploration and synthesis of ideas? The following are some ideas that might help.

PROJECT ZERO

HARVARD GRADUATE SCHOOL OF EDUCATION



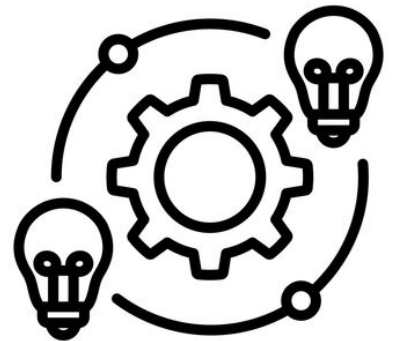
Project Zero (PZ) is a “Thinking Routines Toolbox” that contains a set of prompts or sequences that scaffold and support student thinking ([Project Zero Thinking Routines website](#)). These routines are based on a series of research projects conducted by the Harvard Graduate School of Education and are provided in a way that is very concise and usable. While there are many routines that are usable across many content areas, this issue will focus on those that have relevance to the goals of a most mathematics classrooms.

PROJECT ZERO

SYNTHESIZING AND ORGANIZING IDEAS

One of the areas of thinking that students struggle with is finding coherence among the ideas taught in the mathematics classroom. Coherence, one of the three traits, along with focus and rigor, is a design attribute included in the development of the Common Core Mathematics Standards. Unfortunately, these concepts are often presented in a way where coherence is hoped for but not a requisite of learning. The Synthesizing and Organizing Ideas routines will also support formative assessment by allowing students to share the essence of what they are learning and draw future conclusions from these ideas.

First listed is the +1 Routine. This is an instructional move that asks students to use two to three minutes to recall and create a list of key ideas based on what they’ve learned. Then, this document is passed to another student to either elaborate on or add a detail that was missed. After this is accomplished two times, the document is returned to the student who initially generated it. Doing so provides students with insight into what other students found important, adds a layer of accountability to “pay attention”, and engages student memory immediately after the information was presented - aiding in future student recall of the information and allowing more “cognitive space” for thinking to occur.



PROJECT ZERO

COLOR, SYMBOL, IMAGE (CSI) ROUTINE

This routine is excellent for students with limited writing ability. As the student engages in new learning, they choose a color, symbol, and image (CSI) that best represents the key ideas of what was presented to them. With a partner, the students then take turns sharing each CSI, and its connection to what they found as “the point” of learning. This routine enhances student comprehension - an essential part of student thinking. This routine also engages students in synthesis of ideas by connecting their CSI representations with those from their student peers.



PROJECT ZERO

CORE THINKING ROUTINES

Touted as a great place to start if your students are new to thinking routines, Core Thinking Routines utilize a framework of prompts or tasks that ask students to reflect on what was taught - and, hopefully, what they learned. The classic Think, Pair, Share is included in this series of routines. Also, similar to the famously popular notice and wonder boards, the See, Think, Wonder Routine and Think, Puzzle, Explore Routine utilize a simple prompt to spark student conversation, recall instructional content, and think about the topic at hand. There are nine of these strategies that I hope you take time to explore.

PROJECT ZERO

ROUTINES WITH CONNECTIONS TO STEM

If you are a K-5 teacher of mathematics, you are likely a science teacher as well. Here are some thinking routines that can address both subject areas. The Claim, Support, Question routine allows students to dig deeper into ideas presented in the classroom. Very similar to the Claims, Evidence, Reason or CER strategy popular in science instruction, this routine fosters the reasoning aspect of student thinking by forming connections between explicit ideas. From independent student work to collaborative “scientist circles”, this routine works well with any student configuration.

The Same Different Connect Engage Routine is meant to help students practice thinking about the ways people are similar and different and connect these ideas through use of a graphic organizer and discourse with their peers. This format can easily be adapted to ask students to compare the similarities and differences between to related concepts. Adding fractions versus multiplying them, a push force versus a pull force, etc. The engage phase of this routine can be modified to ask the students to develop their own story problems that reflect what was identified.

CONCLUDING THE MATH SERIES

We hope that you enjoyed the four-part OPL Bulletin focused on K-5 mathematics. All prior OPL Education Bulletins can be found on our LIU website (www.liu18.org). Feel free to look around any of the other informational items on this page like Assistive Technology, Special Education Teacher Preparation Programs, and much more.

OPL Education Bulletin

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Assistant Directors

Dr. Rich Mackrell
rmackrell@liu18.org
(570)991-1121

Dr. Jessica Jacobs
jjacobs@liu18.org
(570)718-4631



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