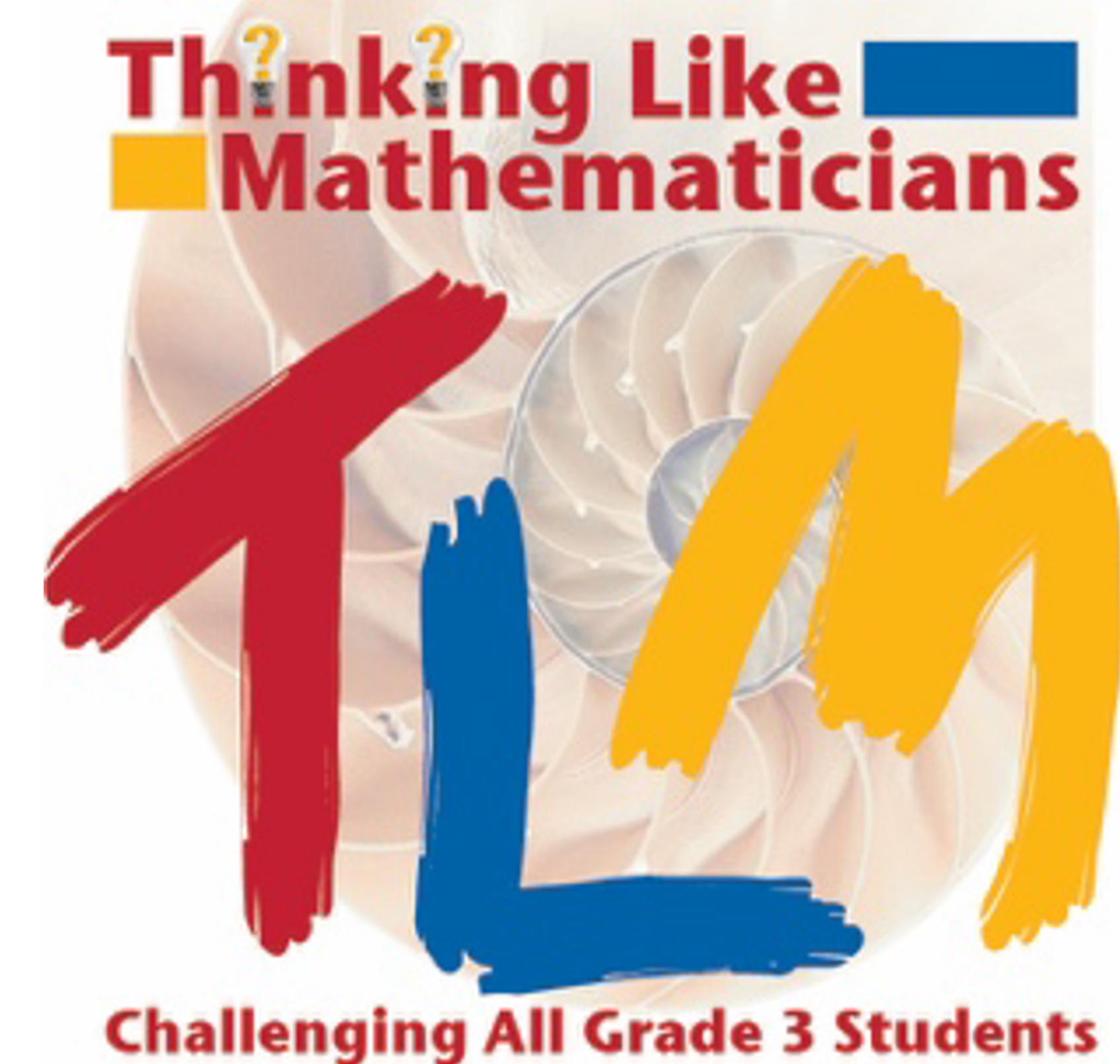


## Differentiation Explained: Accessible Math Differentiation for Elementary Teachers

*E. Jean Gubbins, Ph.D., Stacy M. Hayden, Kelly L. Kearney, Ph.D., Tutita M. Casa, Ph.D., Gregory T. Boldt, Rachael A. Cody, Elizabeth J. Canavan*

NAGC 2022



### Thinking Like Mathematicians (TLM): Challenging All Grade 3 Students (2017-2022)

- Implemented as a multisite randomized control trial in five states;
- Addressed instructional and curricular differentiation for all students;
- Informed educators of developmental identification strategies within professional learning settings;
- Focused on academic needs of students from diverse cultural groups, language groups, economic strata, and those with concurring gifts and learning challenges;
- Produced a high-quality mathematics curriculum unit that was challenging, engaging, and responsive to learning needs, and
- Incorporated various principles of differentiation, enabling and guiding teachers to uncover and promote the talents of all students.

### Differentiated Instruction

- Varies assignments, tasks, or objectives;
- Promotes formative, rather than summative assessments;
- Stimulates student inquiry (Kaplan, 2017; Renzulli & Reis, 2014; Tomlinson, 2001, 2017);
- Focuses on the process of learning and various learning strategies; and
- Adapts instruction based on students' interests and readiness levels.

*"A differentiated classroom provides different avenues to acquiring content, to processing or making sense of ideas, and to developing products so that each student can learn effectively."* (Tomlinson, 2001)

### Fiction or Facts

#### Fiction

- Differentiating for high ability students involves assigning more questions of the same difficulty.
- Differentiation is incompatible with standardized testing.
- Differentiation involves giving students different materials.

#### Facts

- Differentiation involves varying the level of challenge for learning tasks.
- Differentiation prepares students to engage with academic content that meets their needs.
- Differentiation involves changing how a student will learn, what a student will learn, and how a student will demonstrate learning.

### Tiered Activities

Teachers can assign tiered activities according to students' readiness by varying the *challenge level, complexity, outcome, process, products, and resources.*

#### Create tiered activities by:

- modeling for a whole group math lesson,
- engaging in class discussions,
- assigning turn and talks with partners,
- creating small groups based on learner readiness levels.
- *Tier 1 - more teacher support,*
- *Tier 2 - more independent tasks,*
- *Tier 3 - more advanced content, concepts, and skills as well as critical thinking prompts.*

#### Teachers may:

- Select the activity organizer (concept, generalization, skill),
- Consider students' learner readiness, interests, learning profiles, and talents,
- Create challenging activities that prompt students to use key skills to understand big ideas and concepts,
- Chart the complexity level,
- Modify the activity, considering materials and forms of expression to create three different groups of activities,
- Match tasks to students, and
- Coach for success.

### Strategies

#### Questioning Strategies

- Adjust questions to students' readiness levels.
- Ask follow-up questions
- Use oral, written, and visual presentations to prompt students to answer questions.
- Use open-ended questions to encourage creative mathematical thinking.

#### Grouping Strategies

- Apply flexible homogeneous and heterogeneous grouping.
  - *whole groups:* arrange students' seating, provide visuals, ask students to engage in "turn and talks."
  - *small groups:* use self-assessment practices, offer learning extension for high-ability groups, and provide multiple methods of accessing content.

### Survey Responses

#### Professional Learning

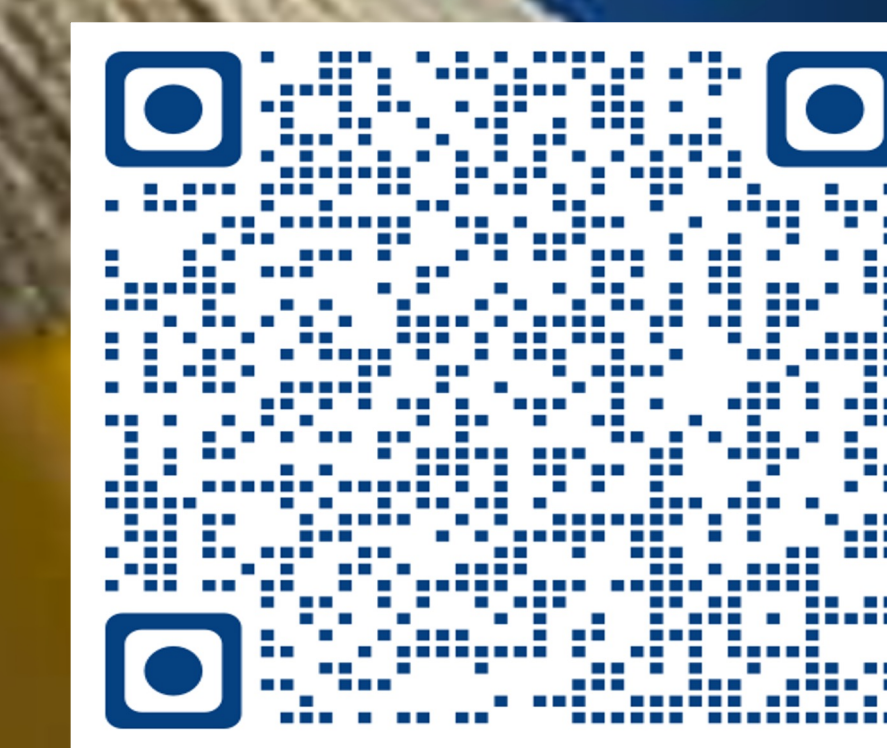
*"I have received very little professional development on differentiation. Most of my learning opportunities have come from meeting with colleagues to discuss curriculum and how to make changes to enhance students' learning experiences."*

#### Barriers

*"The biggest barrier is the time it takes to plan, organize and implement differentiation in a math class. Being an elementary teacher means I teach all subjects and it is challenging to have enough time to differentiate instruction in all subject areas."*

#### Differentiation Successes

*"Although it takes more time and effort in planning, the outcomes pays off in dividends. Meeting students where they are academically is crucial, and even differentiating content based on interest has excellent outcomes. It increases motivation and engagement."*



### References

- Kaplan, S. N. (2017). Differentiating with depth and complexity. In C. M. Callahan & H. L. Hertberg-Davis, *Fundamentals of gifted education: Considering multiple perspectives* (2nd ed., pp. 270-278). Routledge.
- Renzulli, J. S., & Reis, S. M. (2014). *The schoolwide enrichment model: A how-to guide for talent development* (3rd ed.). Routledge.
- Tomlinson, C. A. (2001). *How to differentiate instruction in mixed-ability classrooms* (2nd ed.). ASCD.
- Tomlinson, C. A. (2017). *How to differentiate instruction in mixed-ability classrooms* (3rd ed.). ASCD.

Differentiation is an essential component of instruction for all learners, but many teachers report uncertainty about how to effectively differentiate math instruction and curriculum in their classrooms, especially for students who demonstrate high levels of potential. Dispelling myths that surround differentiation may enable teachers to use the differentiation process to their advantage. This session will examine aspects of differentiation and how access to relevant professional learning opportunities influences teacher beliefs. Specifically, we will present survey results that report teachers' experiences with differentiation, their understanding of the practice, and their beliefs about differentiation's impact on student achievement. Presenters will describe teachers' reported beliefs from a Thinking Like Mathematicians (TLM): Challenging All Grade 3 Students survey pre- and post- intervention. For context, the TLM project spanned 5 years (2017-2022) and investigated the use of pre-differentiated (i.e., tiered lessons) and enriched, challenging, and engaging curriculum. Other factors in this discussion will include the development of tiered mathematics activities at varied levels of challenge and how to appropriately group students demonstrating varying levels of potential. Presenters will share resources to correct misconceptions about differentiation in mathematics and provide examples of tiered activities provided will help teachers enhance their own classroom instruction. In addition, the presenters will discuss how differentiated instruction can support students in demonstrating gifted potential. They will then discuss the results of project surveys related to differentiation and describe the implications of these results. To conclude, the presenters will recommend strategies to provide appropriate challenges for students exhibiting high potential behaviors.

Attendees will be able to identify misconceptions about differentiation in mathematics instruction and explain why these misconceptions are false.

Attendees will be able to give examples of appropriately differentiated tiered activities.

Attendees will be able to describe effective grouping strategies for students demonstrating high potential.