Mathematics Instructional Framework
Launch – Explore- Summarize – Reflect - Apply (LESRA)

About instructional frameworks. Instructional frameworks provide districts, schools, and classrooms with a clear and cohesive focus on instruction by combining specific expectations for student learning with specific strategies that guide teaching and assessment. The instructional framework selected can serve as a powerful guide for aligning curriculum, teaching, assessment and the learning environment with principles of effective mathematics instruction. Ultimately, an effective instructional framework can move mathematics teachers beyond the mechanical aspects of planning lessons and units to a deeper consideration of how to advance students' mathematical understanding throughout.

What's more, adopting and implementing a *common* instructional framework across a school or district can serve to strengthen the impact of instruction on students. The common language, coherence and focus of a common framework promotes collaborative inquiry around instruction; collaborative inquiry, in turn, raises the level of teacher practice.

About this document. Wisconsin DPI recognizes that schools and districts locally determine the instructional framework that will guide their mathematics instruction. However, for the purpose of organizing resources around critical aspects of universal mathematics instruction, Wisconsin DPI's Common Core State Standards Implementation (CCSSI) team for mathematics has selected LESRA (Launch – Explore- Summarize – Reflect – Apply) as its instructional framework. This document provides users with an explanation of each component of the LESRA instructional framework along with questions to consider when planning each component.

Note that the time allocated to each instructional component in this framework is dependent on a variety of factors, including the age/grade level of the students, the complexity of the mathematical understanding to be developed, and students' prior knowledge and experiences with the mathematical concepts. For example, the *Launch* component might be as short as five minutes for familiar topics or with younger students, or as long as a whole class period for newer, more complex concepts or with older students. However, relative to the other components, the time allocated to *Launch* is typically the shortest so that students are maximally engaged in the mathematical thinking supported in the other four components.

How to use this document. It is not expected that teachers go through every question in this document for every lesson or unit. Instead, its intent is to present a sequence and strategy for teachers to consider critical aspects of lessons and units before instruction begins. By focusing on key questions within each component when planning, then - - over time - - teachers will internalize the LESRA process for effective instruction.

References:

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Wisconsin Department of Public Instruction. (2013). *Professional learning on demand: Lesson and unit plan development.* Available http://www.livebinders.com/play/play?id=823390

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SELECTING AND SETTING UP A MATHEMATICAL TASK

About

This component lays the groundwork for the lesson or unit by asking the teacher to identify the mathematical goals for the lesson. Here, the focus is on the mathematical thinking the teacher wants students to engage in, beyond what students will be doing. Beyond getting to an answer, the teacher considers the mathematical ideas students will learn more deeply as a result of working on a mathematical task. These core ideas inform the direction for decision-making, feedback, and formative assessment throughout the lesson or unit. "The intent… is to help teachers keep 'an eye on the mathematical horizon' (Ball, 1993) and never lose sight of what they are trying to accomplish mathematically" (Smith et. al., 2008).

Grouping

N/A

Questions to consider in planning

- What are the big ideas you want students to understand about mathematics as a result of this task?
- In what ways does the task build on students' previous knowledge, life experiences, and culture?
- What are the ways the task can be approached? Which of these methods do you think your students will likely use?
- What mathematical and general academic vocabulary does this task bring out?
- What resources or tools will students have to help them access or reason through the task?
- What do you know about your students that will help to make this task personal, relevant, and engaging to them?
- What misconceptions / likely errors will your students have/make? How will you structure the task to challenge these?
- What particular challenges might the task present to struggling students or students who are English Language Learners (ELL)? How will you address these challenges?

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LAUNCH

About

In this component, the teacher presents the task to the whole class, helping students understand the setting, mathematical context and the challenge, and clarifies goals and expectations. Here, the teacher wants to give students enough information so that they can do the task — but not give too much away at this point! Unless the teacher has to do a mini-lesson to refresh students' memories about a certain concept or vocabulary, s/he should avoid direct instruction.

Grouping

Whole group

Questions to consider in planning

- What is the most interesting/engaging way you can introduce the task?
- How will you introduce students to the task without reducing the demands of the task?
- What questions should you ask to help your students access their prior knowledge? Do you need to do a mini-lesson (direct instruction)?
- What questions will you ask to help students access their prior knowledge and relevant life and cultural experiences?
- What will students need to understand the demands of the task? Do you need to do a mini-lesson (direct instruction) first?
- What supports/scaffolds will you need to develop or provide so that all of your students can access the task?
- What domain-specific words, concepts, or ideas do students need to know to begin to work on the task? Do you need to do a mini-lesson (direct instruction) first?
- What general academic words do students need to know to begin to work on the task? Do you need to do a mini-lesson (direct instruction) first?
- What expectations for group and independent work do you want to reinforce or re-teach?

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EXPLORE

About

This is where students work in small groups or pairs to solve the task, shifting the onus of learning from the teacher to the students. This is your students' chance "to get messy with the math" by applying their prior knowledge and skills to persevere in problem-solving. The teacher's role is to move among groups, allow students to struggle and make mistakes, and listen closely. See what solutions your students are coming up with. Help students who are stuck or who are ready to move ahead, mainly through questions to stimulate their thinking. If the whole class is running into the same difficulty, clarify your Launch; otherwise, avoid mini-lecturing!

Grouping

Small group or pairs (typically); individual

Grouping considerations: If the task is….

….*particularly rich and complex* (i.e. with multiple solutions or multiple ways of attacking the problem), consider heterogeneous groups; Students of varying skills and strengths are likely to have different approaches, which is good; the more complex the problem, the more heads are needed for success.

…an extension or deepening of previous learning, consider homogeneous groups; It sometimes makes sense to group students of similar skills or understandings. On some lessons, your more advanced students really might benefit from working together to extend the lesson and go deeper with the concepts.

…*calls for risk-taking,* consider self-selected groups; students may be more willing to make mistakes when they're working with their friends.

Questions to consider in planning

- What different strategies do you anticipate your students using to explore the task?
- What will you see or hear that lets you know how students are thinking about the mathematical ideas (vs. non-mathematical aspects of the task)?
- What's the best way to group students to explore this task?
- What materials will students need to encourage diverse thinking and task-solving?
- What questions will you use as you circulate among students to…
  - Assess understanding of the key mathematical ideas?
  - Help a group get started or make progress on the task?
  - Advance thinking on key mathematical ideas?
  - Re-direct students focused on non-mathematical aspects of the task?
  - Prompt thinking if the level of frustration is too high?
  - Probe further into the task if the initial question is "answered"?
  - Encourage peer-to-peer discussion, thinking, and learning?

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SUMMARIZE

About

This is where the main *teaching* occurs. Bring the whole group back together to follow up on *Exploration* and make mathematical connections. Purposely select students to explain their solutions, selecting for a range and variety of solutions. Here you'll use probing questions to press students to articulate and reveal their thinking so that you can guide them through misconceptions and to the big mathematical ideas that are the intended focus of the task.

Grouping

Whole group

Questions to consider in planning

- Which solution paths do you want to have shared during the class discussion? Will the order in which solutions are presented influence students' understanding of the mathematical ideas that are the focus of your lesson?
- How will you orchestrate the discussion so the students summarize the thinking in the task? What specific questions will you ask so that students:
  - Make sense of the mathematical ideas that you want them to learn?
  - Expand on, debate, and question the solutions being shared?
  - Make connections among the different strategies that are presented?
  - Look for patterns?
  - Begin to form generalizations?
- How will you ensure that, over time, all students have the opportunity to share their thinking and reasoning with their peers?

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REFLECT

About

In this component, each student is asked to establish her/his level of mathematical understanding relative to the instructional goal. The purpose of the *Reflect* segment is two-fold. For the student, this segment helps each child "lock in" her/his own learning and set learning goals. For the teacher, the *Reflect* segment allows her/him to assess how well students are progressing toward the goals of the lesson/unit. Information gathered here helps the teacher determine the depth of understanding of mathematical ideas and/or whether students still hold misconceptions relative to these ideas. *Reflect* helps the teacher determine who may need additional teaching and/or exploration as which students have a firm grasp of concepts and are thus ready for deeper levels of learning.

Grouping

Individual

Questions to consider in planning

- How will students demonstrate their individual understanding of the mathematical ideas presented in the task and discussed by the class?
- How will students assess their own level of understanding relative to the instructional goal?
- What evidence will you be looking for to understand where students are in their thinking on the underlying mathematical concepts?
- What evidence will let you know which students need further exploration or teaching? Still hold misconceptions?
- What evidence will let you know which students are ready to move on to deeper learning or further challenge?

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APPLY

About

The focus here is on generalizing the mathematical understanding developed by the task. In this component, students extend the use of the skills and concepts learned to make connections to other learning, to use this learning fluently, and/or to apply this learning in other contexts or real-world scenarios. The teacher designs this application and practice based on the current learning needs of students (revealed in the *Reflect* component) and on the strengths and interests of students.

Grouping

Individual, small group, pairs, whole group

Questions to consider in planning

- How does the mathematical thinking extend beyond the initial task? How does it connect to other mathematical concepts? Other disciplines? To the students' daily lives? To the community? To the work place?
- What meaningful questions, problems, or projects will engage and inspire students?
- What evidence will let you know that students are able to transfer the mathematical learning as intended?

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