Fayette County Public Schools
Mathematics Guidance Document for Tier One *Instructional Design Models*, PK

Whole Group 5 - 10 minutes Whole group contains blocks of time devoted to instruction through modeling and/or mathematical discovery with intentionally planned higher-level questions using Early Childhood Kentucky standards. This can be included in whole group with literacy and math instruction based on the needs of students. • Data-driven decision making using AEPS • Collaboration through teamwork or partner work • Assessments and checklists meeting AEPS and IEP goals. **Instructional Design Structures for Whole Group:** Inquiry-Based Instructional Design Model (IDM)	**Daily Math Routine: 5-10 minutes (Can be outside of whole group)** Purpose: Students engage in and discuss mathematics to develop number sense, fluency, and reasoning. **Examples:** Transition Counting, Meal Time Counting, Mighty Minutes **Grade-Level Standards-Based Instruction: 3 minutes** Share learning intention and success criteria to set a purpose for learning, engage students with a "hook", ask questions to activate prior knowledge, introduce new learning and vocabulary, and/or provide visuals and manipulatives. **Student Practice: 5-10 minutes** Intentionally selected activities for students to complete **cooperatively, during center time,** while the teacher (classroom teacher or paras) provides in-the-moment interaction and feedback. Formatively assess students through observation. Students are actively engaged and should productively explore, persevere, and compare.
Small Group 10-15 minutes **During or Outside of Center Time** 60 minutes Instruction includes: • Small groups conducted with one teacher. • Data-driven decision making as teacher monitors students working, whether at teacher-directed table or while working in centers. • Differentiation based on student need and scaffolding. • Accountability measures in place to monitor independent and teacher-led instruction **Instructional Design Structures for Small Group:** Preschool Teacher-Led Small Group Mathematics Instructional Design Model (IDM)	**Examples of Math Activities in Interdisciplinary Learning Centers: Students could work collaboratively or independently depending on the purpose of each task.** *Independent work should be tasks students can successfully complete without teacher support.* • Patterning/Sequencing • Sorting/Categorizing • Counting and Cardinality • Identify and use common shapes. • Problem Solving • Demonstrates understanding of color, shape, and size concepts. • Qualitative and quantitative concepts • Demonstrates understanding of printed numerals. • Spatial and temporal concepts.
Summarize 3 - 5 minutes	• Review learning intention and success criteria • Reflect on various activities presented and available in centers • Possible time for assessments based on AEPS

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<table>
<tr>
<td rowspan="2">Whole Group
30-50 minutes

Whole group contains blocks of time devoted to instruction through modeling and/or mathematical discovery with intentionally planned higher-level questions using grade-level Kentucky standards.

• Data-driven decision making
• Collaboration through teamwork or partner work
• Formative Assessments

Instructional Design Structures for Whole Group:
Inquiry-Based Instructional Design Model (IDM)
Gradual Release Instructional Design Model (IDM)</td>
<td>Daily Math Routine: 5-10 minutes (Can be outside of whole group block if needed)
Purpose: Students engage in and discuss mathematics to develop number sense, fluency and reasoning.
Examples: Calendar Math, Problem of the Day, Number Talks, Math Journal, Splat!, Notice/Wonder, Which One Doesn't Belong, Esti-Mysteries, Estimation 180, My Favorite "No", 3-Act Math Task, K-2 Sentence Frames</td>
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<tr>
<td>Grade-Level Standards-Based Instruction: 15 to 30 minutes
Share learning intention and success criteria to set a purpose for learning, engage students with a "hook", ask questions to activate prior knowledge, and introduce new learning and vocabulary. Use concrete examples (manipulatives) and move to pictorial, then toward abstract/symbolic (this transition may occur over multiple lessons).

Student Practice: 10-15 minutes
Devoted time for intentionally selected questions for students to complete cooperatively while the teacher provides in-the-moment feedback. Formatively assess students through observation. Students are actively engaged and should productively struggle, explore, persevere, share, justify, and compare.</td>
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<tr>
<td rowspan="2">Small Group
30-45 minutes
Instruction includes:
• Deliberate small groups happening simultaneously
• Data-driven decision making as teacher monitors students working, whether at teacher-directed table or while working in groups
• Differentiation based on student need and scaffolding
• Accountability measures in place to monitor independent and teacher-led instruction
Instructional Design Structures for Small Group:
Workshop Instructional Design Model (IDM) or
Teacher-Led Small Group Instructional Design Model (IDM)</td>
<td>Potential Teacher Table:
• Tier 1 Differentiated Instruction correlated to whole-group instruction
• Scaffolded practice based on formative assessment</td>
</tr>
<tr>
<td>Examples of Workstations: Students could work collaboratively or independently depending on the purpose of each task.

Independent work should be tasks students can successfully complete without teacher support.

• Fluency
• Spiral Review
• Writing in response to math
• Enrichment
• Problem Solving</td>
</tr>
<tr>
<td>Summarize
5-10 minutes</td>
<td>• Review learning intention and success criteria
• Reflect on various strategies used
• Possible time for formal formative assessment</td>
</tr>
</table>

Mathematics Guidance Document for Tier One *Instructional Design Models,* 6-12	
Daily Math Routine 5-10 minutes	Purpose: Students engage in and discuss mathematics to develop number sense, fluency, and reasoning. • Vocabulary practice • Standards-based questions connected to current or previously taught standards • **Examples:** Calendar Math, Problem of the Day, Number Talk, Math Journal, Splat!, Notice/Wonder, Which One Doesn't Belong, Esti-Mysteries, Estimation 180, My Favorite "No", 3-Act Math Task • Review of lesson's visible learning
Grade-Level Standards-Based Instruction 15-30 minutes **Instructional Design Structures for Whole Group:** Inquiry-Based Instructional Design Model (IDM) or Gradual Release Instructional Design Model (IDM)	**Teacher-led Whole Group:** Share learning intention and success criteria to set a purpose for learning, engage students with a "hook", ask questions to activate prior knowledge, and introduce new learning and vocabulary. Use concrete examples (manipulatives) and move to pictorial, then toward abstract/symbolic (this transition may occur over multiple lessons). Whole group contains blocks of time devoted to instruction through modeling and/or mathematical discovery with intentionally planned higher-level questions using grade-level Kentucky standards. • Data-driven decision making • Collaboration through teamwork or partner work • Formative Assessments
Student Practice 10-15 minutes OR **Small Group** 15-20 minutes **Instructional Design Structures for Small Group:** Workshop Instructional Design Model (IDM) or Teacher-Led Small Group Instructional Design Model (IDM)	Devoted time for intentionally selected questions for students to complete collaboratively while the teacher provides in-the-moment feedback. Formatively assess students through observation. Students are actively engaged and should productively struggle, explore, persevere, share, justify, and compare. **Small Group Instruction/Workstations:** Students could work collaboratively/independently or with the teacher depending on the purpose of each task. Independent work should be tasks students can successfully complete without teacher support. • Deliberate small groups happening simultaneously • Data-driven decision making as teacher monitors students working, whether at teacher-directed table or while working in groups • Differentiation based on student need and scaffolding
Summarize 5-10 minutes	Teachers use this time to connect student learning to the visible learning, formatively assess student learning, and help determine next steps. • Review learning intention and success criteria • Reflect on various strategies used • Possible time for formal formative assessment • Students share-out and synthesize their learning.

Glossary:

Collaborative learning: Collaborative learning is "a method that implies working in a group of two or more to achieve a common goal, while respecting each individual's contribution to the whole" (McInnerney and Robert 2004, 205). Collaboration implies direct interaction among individuals to produce a product and involves negotiations, discussions, and accommodating others' perspectives. Successful collaboration requires participants to share in the process of knowledge creation (Dillenbourg et al. 1996; Roschelle and Teasley 1995).

Cooperative learning: Cooperative learning is a specific kind of collaborative learning. In cooperative learning, students work together in small groups on a structured activity. They are individually accountable for their work, and the work of the group as a whole is also assessed. Cooperative groups work face-to-face and learn to work as a team. Cooperative learning can be defined as "working together to accomplish shared goals" (Smith 1995), cooperation can be achieved if all participants do their assigned parts separately and bring their results to the table; cooperation is more focused on working together to create an end product, (Dillenbourg et al. 1996; Roschelle and Teasley 1995).

Enrichment: To make learning more meaningful, substantial, and rewarding through lesson extensions using rigor and depth.

Fluency: In mathematics, the meaning denotes efficiency, accuracy, flexibility and appropriateness. Being fluent means students flexibly choose among methods and strategies to solve contextual and mathematical problems, understand and explain their approaches and produce accurate answers efficiently.

Formative Assessment: Formal and informal assessment procedures during the learning process in order to modify teaching and learning in response to student need.

Learning Intention: Specification of what students are supposed to learn.

Prerequisite Skills: Skills students should have mastered prior to current learning in order to access grade-level content.

Spiral Review: Idea that after introducing and teaching a skill, students continue to practice it regularly throughout the school year in order to maintain what they have learned.

Success Criteria: Discrete learning steps that provide a clear answer to the question, "How will I know that I have learned it?"

Vocabulary: Words and their meanings.

Work Stations: One of the ways to address the varied needs of students and curricular demands of classrooms. Teachers can use these to engage students with the curriculum by appealing to different interests, levels of understanding, and zones of proximal development. Workstations (or sometimes called **centers**) provide an opportunity for students to practice and apply skills and strategies taught within the classroom. These should always be rehearsal/practice tasks, NOT new learning.

Inquiry/Problem-Based Tier One *Instructional Design Model* for Mathematics

Inquiry-based learning is a student-centered method of teaching mathematics which requires active participation of students by involving them in posing questions. Rather than showing facts or a clear path to a solution, the instructor guides students via well-crafted problems through a mathematical discovery, guiding them in "how to think" instead of "what to think."

Lesson Component	Teacher Role	Student Role
Anticipate	• Complete task as teacher team before instruction • **Anticipate** all possible student strategies for problem solving task to create observation tool • Identify possible misconceptions and **anticipate** teacher prompts, cues, and scaffolds	*Note: There is no student role because this happens during team planning.*
Monitor **CRA**	• Pose the task to students • Provide brainstorming of possible strategies as a whole group as needed • Supply appropriate tools for completing the task • Circulate and **monitor** students as they are exploring and working through their strategy • Take anecdotal notes on observation tool • Ask guiding questions and use anticipated prompts, cues, and scaffolds *Note: may provide feedback, but avoid direct instruction, answer questions with questions to encourage inquiry.*	• Express notice and wonder about the problem solving task • Determine plan of action/strategy for problem solving • Determine and use appropriate tools needed to solve • Work independently or in groups to explore ideas and to see if strategy works • Persevere in problem solving without relying on the teacher as the source of knowledge • Explain/justify reasoning and problem-solving strategy when working with group
Select & Sequence	• **Select** 2-3 students who will share their work in the class discussion from the observation tool • Determine the best **sequence** to have students present their solutions - often starting with the most concrete examples and working up to the more abstract solution strategies	• Speak clearly using appropriate math vocabulary • Answer other students' questions about their work, if chosen to share their process. • Generate questions to ask classmates about their thinking.
Connections	• Summarize the lesson by making explicit **connections** among the strategies shared including the language of the standard with the learning intention and success criteria.	• Listen with intent to understand • Discuss how the different strategies may connect. • Reflect on my work and make any revisions needed based on class discussion.

References:

Hege, B. (2022, April 4). *Why "I Do, We Do, You Do" Is NOT Always Best Practice for Teaching Math — Mix and Math*. Mix And Math. https://www.mixandmath.com/blog/gradual-release-model-teaching-math

You Do, We Do, I Do: A Strategy for Productive Struggle. (2022, July 25). ASCD. https://www.ascd.org/el/articles/you-do-we-do-i-do-a-strategy-for-productive-struggle

Inquiry-Based Learning. (n.d.). https://www.sac.edu/AcademicAffairs/TracDat/Pages/Inquiry-Based-Learning-.aspx

Inquiry Maths - An Inquiry Maths lesson. (n.d.). https://www.inquirymaths.com/home/an-inquiry-lesson

5 Practices for Orchestrating Productive Mathematics Discussions, 2nd Edition - National Council of Teachers of Mathematics. (n.d.).

Teacher-Led Small Group MathematicsTier One Instructional Design Model

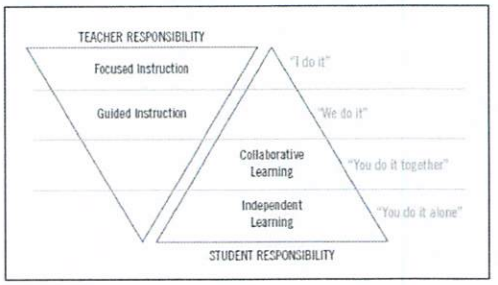
This model includes accessible tasks, open-ended problem-solving, small-group instruction, student choice and time for meaningful practice. By using the familiar structure of the literacy block/workshop, students can transition into the same way of working independently, playing games, and problem-solving.

Small Group/Workstation - 45-60 minutes		
	Teacher Role:	**Student Role:**
Teacher Table While students are in workstations, the teacher pulls small groups for guided lessons correlating to the content taught during whole group or evidence of learning/misconceptions as determined by formative assessments. *Note: Allow for time to monitor students in workstations; students may not visit the teacher table daily.*	• Plan purposeful and differentiated lessons • Meet with identified groups of students based on data • Revisit learning intention/success criteria from mini-lesson • Facilitate learning through problem-based tasks • Provide math tools to support thinking • Provide feedback on strategies • Record anecdotal notes and formative assessment data	• Analyze misconceptions • Ask clarifying questions • Actively participate • Use math tools to support thinking • Explain reasoning
Workstations In the math stations, student work is organized and differentiated based on student need. *Note: Independent work should be REVIEW vs. initial learning*	• Plan purposeful and differentiated stations • Provide students with choice of stations or activities within a station • Provide math tools to support thinking • Monitor students in workstations • Reflect on observed behaviors to adjust work stations • Hold students accountable for work during stations • Provide feedback when appropriate	• Revisit previously learned content • Apply knowledge through partner work or collaborative grouping • Use math tools strategically • Complete task as described • Document work for evidence / accountability through math journal or recording sheets • Construct viable arguments • Critique the reasoning of others
Reflection / Closure A deliberate time for students to reflect on what they've learned during the workstations.	• Facilitate discussion of strategies used during workstations • Monitor student progress during the discussion	• Share strategies • Analyze strategies for effectiveness and efficiency • Reflect on learning to identify strengths and areas of further growth

References:

Lempp, J. (2022). *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More.* Heinemann.

Gradual Release of Responsibility
Tier One *Instructional Design Model* for Mathematics



An instructional model that shifts the cognitive load from the teacher as a model, to shared responsibility between the teacher and learner or learner and learner, to independent practice and application of the skill taught.

This model includes four phases that provide students with modeling, scaffolding and practice required to learn a new skill or concept. Students should experience all four phases when learning new content. Checks for understanding should occur at each phase.

Please note: Phases can be reordered, meaning every lesson is not required to start with Explicit Instruction.

Lesson Component	Teacher Role	Student Role
Explicit Instruction (I do) **Suggested time is 15 minutes or less*	• Engage students with a "hook" • Share learning intention and success criteria to set a purpose for learning • Activate prior knowledge • Introduce new concept or skill through direct explanations, modeling, and think-alouds • Communicate using the language of the standard • Model appropriate tools strategically	• Engage with the lesson's purpose in a meaningful way • Process information • Generate questions for clarification • Takes notes in their own words (if needed)
Guided Instruction (We do) CRA	• Facilitation of learning shifts from teacher to student-led • Conduct informal formative assessment and respond to student needs • Address misconceptions • Provide scaffolds • Provide appropriate tools strategically	• Experience productive struggle • Process information in order to answer questions and think critically • Engage with appropriate tools
Collaborative Learning (We do it together) **Core Features:** Positive Interdependence Individual Accountability Equal Participation Simultaneous Interaction	• Rengage learning intention and success criteria • Monitor student work and provide feedback in the form of questioning • Provide scaffolds ensuring release to students • Encourage the use of appropriate tools strategically	• Experience productive struggle • Apply knowledge through collaborative processing • Construct viable arguments • Develop and ask higher order questions • Critique the reasoning of others • Use the language of the standard
Independent Learning (You do it alone) **Examples:** Exit slips, quality tasks, Independent classroom assignment	• Provide feedback • Collect formative data based on the learning intention to identify next steps and misconceptions • Intentionally select problems to show student understanding of standards and success criteria • Encourage the use of appropriate tools strategically • Close lesson by reviewing learning intention and success criteria to ensure students understand the purpose • Teacher may choose to pull a small group of students based on formative assessment during the collaborative phase	• Experience productive struggle • Produce a product based on the learning intention and success criteria independently • Self-regulate • Make sense of problems and persevere in solving them

References:

Fisher, D., & Frey, N. (2021). *Better Learning Through Structured Teaching: A Framework for the Gradual Release of Responsibility* (3rd ed.). ASCD.

Almarode, J. T., Fisher, D., Thunder, K., Hattie, J., & Frey, N. (2019). *Teaching Mathematics in the Visible Learning Classroom, Grades K-2 (Corwin Mathematics Series)* (First). Corwin.

Kagan, M., & Kagan, M. (2009). *Kagan Cooperative Learning*. Van Haren Publishing.

Math Workshop Tier One Instructional Design Model

This model provides time for varied practice and time for the teacher to observe, informally assess, and meet with students individually or in small groups in real-time to review or extend content targeted to students' needs. Students are provided with repeated experiences with the concepts being learned and time to practice essential skills and refine strategies.

Workshop - 30 to 60 minutes		
Workshop	**Teacher Role:**	**Student Role:**
In Math Workshop, students are given time to: 1. Problem-solve new mathematical challenges. 2. Practice learned skills. 3. Think, make mistakes, and self-correct. Math Workshop is also designed to help students develop independence and learn to take responsibility for their own learning. ***Important:** **Math Workshop is always preceded and followed by whole-class activity/discussion.**	• Act as facilitator • Plan quality tasks/games/activities • Circulate while students work and ask questions that spur student thinking • Focus on conceptual understanding • Incorporate manipulatives as needed to support student learning • In-the-moment teaching (teacher is able to intervene at point of error or confusion) • Work with small groups or individuals as needed • Assess individual students' learning and understanding through formative assessments • Allow student choice of workshop activities or tasks	• Work on a variety of activities, usually focused on similar mathematical content • Struggle with challenging mathematics and learn from misconceptions and errors • Work cooperatively and learn from each other • Talk about their reasoning with each other as they work • Repeatedly play games/tasks to achieve fluency • Solve problems similar to previous problems, in new contexts and apply in new situations • Document work through math journals or recording sheets
Reflection / Closure A daily time for students to reflect on what they've learned during the day's math session. This could be from workshop tasks or from collaborative tasks. This is the time for the teacher to solidify the intended learning intention for the lesson.	• Facilitate discussion of strategies used during workshop or collaborative tasks • Monitor student progress during the discussion using anecdotal notes and data collection • Strategically choose which students will share their work in order to highlight the intended learning intention	• Share and explain strategies • Analyze classmates' strategies for effectiveness and efficiency • Reflect on learning to identify strengths and areas of further growth • Self-assess based on the intended learning intention/success criteria

References:

Akers, J. (2017). *Investigations 3 in Number, Data and Space Implementing Investigations in Grade*. Pearson Education Inc.

Diller, D. (2011). *Math Work Stations Independent Learning You Can Count On*. Stenhouse

Lempp, J. (2017). *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More*. Heinemann.

Gilbert, E. (2023, January 20). *Shifting To a Guided Math Workshop Model*. Houghton Mifflin Harcourt. https://www.hmhco.com/blog/shifting-from-a-traditional-math-classroom-to-a-math-workshop-structure