

## Intervention Name: Early Learning in Mathematics (ELM)

### Common Core State Standards Domain Areas: (check all that apply)

Counting and Cardinality (K)	Operations and Algebraic Thinking (K-5)	Numbers and Operations in Base Ten (K-5)	Numbers and Operations – Fractions (3-5)	Measurement and Data (K-5)	Geometry (K-HS)	Ratios and Proportional Relationships (6-7)	The Number System (6-8)	Expressions and Equations (6-8)	Statistics and Probability (6-HS)	Functions (8-HS)	Number and Quantity (HS)	Algebra (HS)	Modeling (HS)
X	X	X											

### Setting: (check all that apply)

Whole-class	Small-group	Individual	Acquisition	Fluency	Generalization
X			X	X	X

### Focus Area: (check all that apply)

**Function of Intervention:** ELM is a whole-class intervention designed for kindergarten students. ELM supports the mathematics learning of all kindergarten students, and research results indicate improved mathematics performance for students with and without mathematics difficulties.

**Brief Description:** ELM focuses on three important content areas for kindergarten students: numbers and operations, measurement, and geometry. A focus on mathematics vocabulary is embedded within each of the three content areas. The primary skills across the three content areas include the following (Clarke et al., 2011):

#### *Numbers and Operations*

- Counts (stable order, one-to-one correspondence, cardinality; 1-100)
- Skip counts
- Reads numbers (1-100)
- Writes numbers (1-30)
- Compares quantities and numbers
- Understands ordinal numbers
- Adds
- Subtracts

#### *Measurement*

- Identifies penny, nickel, dime, quarter
- Tells time to hour
- Measures with inches

#### *Geometry*

- Identifies, extends, creates patterns
- Identifies circle, square, triangle, rectangle, oval, hexagon, cube, sphere, cone, cylinder
- Interprets graphs

In the set of 120 lessons, every fifth lesson includes a mathematics problem-solving activity.

Supplemental instruction on calendar skills includes the following:

#### *Calendar*

- Says days of week, months of year
- Knows date, month, year
- Understands seasons
- Identifies yesterday, tomorrow, month before, month next

A typical ELM lesson consists of 4 to 5 math activities focused on one of the three content areas.

- The first activity of each lesson introduces or reviews a specific mathematics skill. The teacher uses elements of explicit instruction to model and practice the skill.
- The second/third activities of each lesson provide practice on the lesson's skill or review a previously learned skill.
- The fourth activity of each lesson provides practice on a skill from another content area.
- The fifth activity of each lesson is a paper-and-pencil cumulative review.
- Lessons end with a "Note Home," available in English or Spanish.

While ELM is a program for all kindergarten students, specific elements of ELM were designed to help kindergarten students with or at-risk for mathematics difficulties.

- The scope and sequence enables students to develop strong foundational skills before moving onto more difficult skills.
- The Concrete-Representational-Abstract (CRA) sequence allows students to use manipulatives and pictorial representations to connect to numerals and signs. (See CRA brief on EBI site for a more detailed explanation of CRA.)
- Elements of explicit instruction provide modeling, guided practice, and independent practice on all skills. (See Explicit Instruction brief on EBI site for a more detailed explanation of explicit instruction.)
- Student think-alouds allow students to develop and practice metacognitive skills.
- Formative assessments provide ongoing feedback to students during the learning process.

A tutoring program called ROOTS was developed for students who experience difficulty with ELM. See ROOTS brief on EBI site for more information about that program.

#### Procedures:

- **Duration:** ELM includes 120 lessons that each last 45 minutes (25 to 30 minutes of whole-class instruction; 15 to 20 minutes of teacher-directed written work). A 15 minute supplemental calendar activity accompanies each lesson.
- **Teacher training:** Teachers participate in three 4-hour trainings spread across the school year.
- **Instructional practices:** Teachers work with a classroom of kindergarten students. The ELM lessons include a suggested teacher script that teachers should be familiar with before teaching each lesson. Teachers must prepare student materials and have appropriate manipulatives available for use during each lesson.
- **Monitoring system:** Teachers monitor student progress using informal (e.g., observation) and formal (e.g., progress monitoring) methods.

**Critical Components (i.e., that must be implemented for intervention to be successful):** Teachers must implement ELM lessons with fidelity. Teachers must be prepared to lead each session, engage students in the materials, provide appropriate feedback, and measure student progress as indicated in the training.

**Critical Assumptions (i.e., with respect to prerequisite skills):** None.

**Materials:** Teachers must use the ELM program materials. See [http://ctl.uoregon.edu/research/projects/elm/lesson\\_sampler](http://ctl.uoregon.edu/research/projects/elm/lesson_sampler) for more information.

#### References:

- Chard, D. J., Baker, S. K., Clarke, B., Jungjohann, K., Davis, K., & Smolkowski, K. (2008). Preventing early mathematics difficulties: The feasibility of a rigorous kindergarten mathematics curriculum. *Learning Disability Quarterly, 31*, 11-20.
- Clarke, B., Smolkowski, K., Baker, S. K., Fien, H., Doabler, C. T., & Chard, D. J. (2011). The impact of a comprehensive tier 1 core kindergarten program on the achievement of students at risk in mathematics. *The Elementary School Journal, 111*, 561-584.
- Doabler, C. T., Cary, M. S., Jungjohann, K., Clarke, B., Fien, H., Baker, S., Smolkowski, K., & Chard, D. (2012). Enhancing core mathematics instruction for students at risk for mathematics disabilities. *Teaching Exceptional Children, 44*(4). 48-57.

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