



Numeracy framework

We envision personalized K-5 mathematics instruction informed by effective and frequent assessment, grounded in a balance of research-based instructional practices.

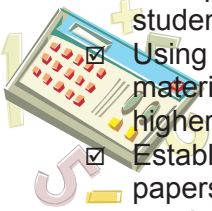
We believe improving mathematical learning requires us to focus on the processes we can control. *Because we believe this, we are committed to:*

- ☑ Protecting daily mathematical instructional time in a productive learning environment.
- ☑ A productive mathematical learning environment may be noisy with purposeful interactions and discussions, inclusive of whole group, small group, and individual instruction, and focused on creating quality, engaging learning opportunities.
- ☑ Authentically engaging students in meaningful numeracy experiences based on the AKS and GPS.
- ☑ Using technology effectively to reinforce and extend numeracy understanding.
- ☑ Teaching questioning techniques through modeling.



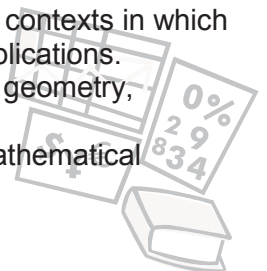
We believe we must know our students well and use what we know about their learning to guide and improve instruction. *Because we believe this, we are committed to:*

- ☑ Engaging our students in a variety of formal and informal assessments to determine the needs of our students and inform our instructional decisions. We will use additional assessments such as exemplars, Big 20s, math journals, and benchmarks to get specific information about our students' competency of the mathematics curriculum.
- ☑ Using student assessment data effectively to guide daily instruction. We will use people and material resources to meet our students' identified needs and extend our students' learning to higher levels.
- ☑ Establishing instructional calendars and using grade level performance standards, anchor papers, rubrics and benchmarks so students and parents will have an accurate understanding of academic expectations and student understanding of mathematical skills.
- ☑ Actively involving students in their own improvement by sharing their computation and problem solving performance allowing them to develop and monitor personal learning goals.



We believe all students can compute and solve problems at higher levels than they are currently performing. *Because we believe this, we are committed to:*

- ☑ Continuously learning and practicing both familiar and new skills as adult learners in mathematical concepts and research-based instructional methods to the degree that we can use them effectively in the classroom to meet the mathematical needs of our students.
- ☑ Engaging students in small group, guided mathematics instruction each day for 90 minutes; a portion of this time should be devoted to real world problem solving and team and target time in grades K-5.
- ☑ Providing direct skills instruction on each student's ability level with the understanding students have not learned the skill if they cannot apply it and generalize it to other contexts.
- ☑ Providing students the opportunity to discuss and write about the mathematical problems they are solving.
- ☑ Challenging above grade level learners to apply their skills in context at even higher levels.
- ☑ Providing the opportunity to solve problems every day.
- ☑ Modeling conceptual understanding of numbers using manipulatives in a variety of formats and contexts in which students can demonstrate the ability to generalize their mathematical knowledge to multiple applications.
- ☑ Implementing daily calendar instruction in grades K-5 integrating process skills, number sense, geometry, measurement, algebra, data analysis and probability.
- ☑ Enlisting parent involvement in and commitment to their children's success in demonstrating mathematical knowledge and demonstration of their skills as mathematicians.





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Classroom Examples

Process Skills

1. Create and use representations to organize, record, and communicate mathematical ideas.
 2. Select, apply, and translate among mathematical representations to solve problems.
 3. Use representations to model and interpret physical, social, and mathematical phenomena.
- Use graphic organizers to solve problems
 - R.O.P.E.S.

Number Sense

4. Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
 5. Understand meanings of operations and how they relate to one another.
 6. Compute fluently and make reasonable estimates.
- Big 20--Practice, Reflection and Instruction
 - Place Value using constructed materials

Geometry

7. Compose and decompose plane and solid figures.
 8. Identify properties and attributes of congruence and symmetry.
- Relate to real world objects and contextualize vocabulary
 - Model visually using manipulative models of geometric shapes

Measurement

9. Utilize measurable attributes (units) to solve problems by comparing and ordering objects.
 10. Develop an understanding of measurement with meaning and processes, including underlying concepts such as partitioning.
 11. Identify and select appropriate measuring tools for a specific measuring task.
- Teach Social Studies and Science integrated with Mathematics
 - Change units and allow students to determine the tools and units needed for each measuring task
 - Model how to transfer knowledge of measurement to varied tasks
 - Metric and Standard measurement comparisons

Algebra

12. Identify, duplicate, and extend number, sequential, and growth patterns.
 13. Represent patterns in graphs.
 14. Identify unknown quantities.
- Model for students in calendar how to identify core patterns and synthesize their extensions/growth
 - Relate literature to numerical patterns

Data Analysis and Probability

15. Use data from graphs to solve problems.
 16. Use estimation as a means for checking validity of answer.
- Graphs for specific purposes
 - Tallies to record data
 - Graphs to tell a story about the data
 - Graphs to represent solutions to real life problems

EVIDENCE

- Calendar Math
- Exemplars
- Graphic Organizers
- Student Work Samples
- Manipulatives
- Centers
- Math Journals
- Student Centered Math Investigations
- Real World Connections to Content
- Partner Games
- Consistent Cumulative Review
- Math and Literature Connections
- AKS-CQI Target and Team Time
- Consistent and Pervasive Use of Quality-Plus Teaching Strategies

VOCABULARY

- Word Walls
- Consistent use of mathematical terminology
- Writing shows evidence of mathematical vocabulary
- Use mathematical language in discussions
- Math dictionaries
- Quality Plus Teaching Strategies (Frayer Diagram, Word Map, Concept Map, Word Splash)
- Word of the Week
- Alphaboxes

TECHNOLOGY

demonstration, whole class lab, centers

Math Keys, Excel (Max Count) software, SuccessMaker (Math Concepts & Skills, Custom Courses, Math Corner) ,www.harcourt.com, Mathematics Web Sites