

PA Core Standards: Mathematics

The most effective and equitable way to support students in their learning is to ensure that most of the time is spent engaging with grade-level content, remediating with precision, and accelerating as needed. It is entirely possible to hold high expectations for all students while addressing unfinished learning in the context of grade-level work. Since time is a scarce commodity in the classroom, strategic instructional and assessment choices are critical.¹

Instruction

It is vitally important that educators are supported to make deliberate instructional choices that allow all students to effectively engage with grade-level work. Instruction must be aligned to a coherent set of learning outcomes, indicating what students should know and be able to do. Dimensions for consideration when planning for instruction include the following:

- **Delivery** is differentiated relative to explicitness through modeling, systematic instruction with appropriate scaffolding and pacing, and provision of immediate corrective feedback to students with sufficient opportunities to respond.
- **Grouping** includes whole group, homogeneous small group, partners, heterogeneous mixed ability small group, independent, and one-to-one.
- **Time** varies relative to a particular area of content, small group instruction versus whole group instruction, and opportunities for students to interact or work independently.
- **Materials** should be evidence-based and adjusted to meet the needs of students and the purpose of the lesson/activity.
- **Learning Environment** must be positive and safe and have clearly defined consistent expectations.

Assessment

A highly developed assessment system includes a balanced approach to using formal and informal assessments, classroom-based evidence showing growth over time, and involving students in the evaluation of their own work. The adoption of a systemic approach enhances the use of assessment data to inform teaching and learning practices. This system should include assessment tools that are congruent with the district's goals and curriculum. Assessments can be done in sync with daily instruction through intentional activities that can collect data to support instructional goals.

This guidance document is designed to identify areas of focus in Mathematics instruction and assessment, grade by grade. Each grade-level document defines high-level focus of instruction, supported by PA Academic Standards. Note that while all standards deserve a defined level of instruction, neglecting key concepts may result in learning gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. Not all content in a given grade is emphasized equally in the standards. Some focus areas require greater emphasis than others based on the depth of the ideas, the time taken to master, and/or their importance to the future mathematics grade levels. More time in these areas is also necessary for students to meet the Standards for Mathematical Practice.

Highlights of Focus Work: K-12

Grade K-2: Addition and subtraction – concepts, skills, and problem solving; place value	Grade 7: Ratios and proportional relationships; arithmetic of rational numbers
Grade 3-5: Multiplication and division of whole numbers and fractions - concepts, skills, and problem solving	Grade 8: Linear Algebra and functions
Grade 6: Ratios and proportional relationships; early expressions and equations	Grade HS: Course specific content area work

For additional support and resources, contact PDE or your local Intermediate Unit. The resources listed below are provided as options and examples. Pennsylvania does not require, recommend, or endorse any specific program or product. All curricular and instructional decisions are made at the local level.

¹ Adapted from 2020–21 Priority Instructional Content in English Language Arts/literacy and Mathematics, Student Achievement Partners/Achieve the Core. May 2020
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GRADE K ACADEMIC STRATEGIES (2022)

This guidance document is designed to identify key strategies with a focus on Mathematics instruction and assessment to support PA Academic Standards. This document is in support of the PDE's [Accelerated Learning](#) information and PA Roadmap: [Focus on Effective Instruction](#).

<p>Focus of Instruction: Numbers and Operations</p> <p>Know number names & count sequence: Rote counts to 100, Count forward beginning from a given number within the known sequence. Name numerals 0 – 20. Represent a number of objects with a written numeral 0-20.</p> <p>Count objects: Use one-to-one correspondence when counting to 20. State the total number of objects counted. Demonstrate understanding that the last number named tells the number of objects counted. Understand that each successive number name refers to a quantity that is one larger.</p> <p>Compare numbers & place value: Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group. Compare two numbers between 1 and 10 presented as written numerals. Compose and decompose numbers up to 19 into ten and ones.</p>	<p>Instructional Resources</p> <p>SAS Online Resources for Instruction Mathematics Menu of Best Practices and Strategies SAS Search Standards (Assessment, Continuum of Activities, Materials & Resources) Pennsylvania's Learning Standards for Early Childhood Teaching Math to Young Children Math Teaching Strategies Videos 10 Key Mathematics Practices for All Elementary Schools The Learning Classroom: Theory into Practice (video series) Early Childhood Math: Six ways to teach Math Throughout the Day</p>
<p>Focus of Instruction: Algebraic Concepts</p> <p>Add and subtract within 10: Represent addition and subtraction with objects, fingers, mental images, drawings, sounds acting out situations, verbal explanations, expressions, or equations. Solve addition and subtraction word problems, and add and subtract within 10, by using objects or drawings to represent the problem. Decompose numbers less than or equal to 10 into pairs in more than one way, by using objects or drawings, and record each decomposition by a drawing or equation. For any number from 1 to 9, find the number that makes 10 when added to the given number, by using objects or drawings, and record the answer with a drawing or equation.</p>	<p>Assessment Resources</p> <p>Pennsylvania Classroom Diagnostic Tools (CDT) Resources SAS Assessment Builder PDE's Assessment Data Protocol Process Early Learning Outcomes Reporting Guiding Principles to Early Childhood Assessment Basics on Assessments Systems FORMATIVE ASSESSMENT: 10 Key Questions Depth of Knowledge with Karin Hess (video 23:16)</p>
<p>Focus of Instruction: Geometry</p> <p>Two- and three-dimensional shapes: Analyze and compare two-and three-dimensional shapes, in different sizes and orientations. Model shapes in the world by building shapes from components and drawing shapes. Use simple shapes to compose larger shapes.</p>	<p>Standards for Mathematics Practices</p> <p>PA Core Standards, Standards for Mathematical Practice Mathematical Practice Standards</p>
<p>Focus of Instruction: Measurement, Data, and Probability</p> <p>Describe and compare measurable attributes: Describe measurable attributes of objects, such as length, weight, area, or capacity. Describe several measurable attributes of a single object. Compare two objects with a measurable attribute in common and describe the difference.</p>	<p>Classroom/Time Management Resources</p> <p>Effective Lesson Planning, Delivery Techniques & Classroom Management Suggestions 5 Classroom Management Tips That Seem Counterintuitive Effective Classroom Management Strategies to Achieve Your Daily Goals 27 Classroom Management Strategies 20 Classroom Management Strategies and Techniques Classroom Management Strategies All the Best Kindergarten Classroom Management Tips and Ideas</p>
<p>Classroom/Time Management</p> <p>Greet each student every day, establish a morning routine & a daily agenda, set the tone, establish a positive environment & build relationships, establish procedures & simple call-and-response patterns, create a classroom management plan including a reward/consequence system, prepare students for a substitute (Guest Teacher Rules) & model flexibility, model appropriate behavior & demonstrate good & bad choices , use positive language, teacher proximity & nonverbal communication, provide visual reminders (carpet spots, word/picture anchor charts), create activity centers that encourage the development of socialization skills, make positive phone calls and send positive notes, understand trauma-informed care.</p>	