

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 2 ACADEMIC STRATEGIES (2022)

This guidance document is designed to identify key strategies with 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>Numbers and Operations</p> <p>Place value: Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.</p> <p>Properties of operations to add and subtract: Add up to four two-digit numbers using strategies based on place value and properties of operations. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. Explain why addition and subtraction strategies work, using place value and the properties of operations.</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 Formative Re-engaging Lessons 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>Algebraic Concepts</p> <p>Represent and solve problems using addition and subtraction: Fluently add and subtract within 20. Apply properties of operations as strategies to add and subtract. Use addition and subtraction within 100 to solve one- and two-step word problems. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20.</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>Geometry</p> <p>Fractions: Partition circles and rectangles into two, three, or four equal shares. Recognize that equal shares of identical wholes need not have the same shape.</p>	<p>Standards for Mathematics Practices</p> <p>PA Core Standards, Standards for Mathematical Practice Mathematical Practice Standards</p>
<p>Measurement, Data and Probability</p> <p>Measurement and estimate lengths in standard units: Measure the length of an object by selecting and using appropriate tools. Measure the same length with different-sized units then discuss the measurement made with the smaller unit is more than the measurement made with the larger unit and vice versa. Estimate lengths using units of inches, feet, centimeters, and meters. Measure to determine how much longer one object is than another.</p> <p>Relate addition and subtraction to length: Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units.</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 Top 5 Classroom Management Tips for 2nd Grade Teachers</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>	